The More Information
You Have,
The Better
We Look!

CLEARPOINT

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APOLLO

DN2500	SNXSM/S1-80, S1-10
DN3000, DN3010	◦ DNXRAM/2MB, (1MB OBSOLETE)
DN3010A 3500, 3550 4000, 4500 5500 (Not Confirmed)	◦ DNX4RAM/4MB-D, /4MB-Z, /S-4MB /8MB, /S-8MB (HPME-DN9/32MB TBA)

APPLE	
MACIIci	◦ MC2RAM/S1-80, MC2RAM/4MB, MC2RAM/D, ◦ SNXSM/S1-80, SNXSM/S4 (PARITY) CPSM08A/S4-80
MACIIcx	◦ MC2RAM/S1-80, /S1-10, MC2RAM/D CPSM08A/S4-80, MC2RAM/4MB
MACII, IIx	◦ MC2RAM/S1-80, /S1-10, MC2RAM/D
SE/30, SE, PLUS	◦ MC2RAM/S1-80
LASERWRITER MACIIfx	◦ APME-NTX/1MB
MAC PORTABLE	◦ APME-POR/2MB, /4MB, /7MB, /8MB

COMPAQ	
DESKPRO 386/20 386/25 /20E 286E 386/25E	◦ COMRAM/1MB, /4MB (NOT COMPATIBLE W/ 386S)
386/20E /25E	◦ COMRAM-EX/1MB (EXPANSION CARD)
DESKPRO 386/33 DESKPRO 486/25 MODEL 650, 320, 84	◦ CMME-33/2MB
DESKPRO 386/33L DESKPRO 486/XX SYSTEMPRO	◦ CMME-SPM/8MB ◦ CMME-33/2MB

DEC

DECSTATION 3100 2100, 3100S DECSYSTEM 3100	◦ DCME-D31/2MB
DECSTA 5000/200	◦ DCME-D52/8MB /32MB
MICROVAX II VAXSTATION II	◦ DCME-M02/2MB /4MB /8MB 16MB DCME-M02/8MB-D (DUAL)
MICROVAX 2000 VAXSTATION 2000	◦ DCME-M20/8MB /16MB
MICROVAX 3200 3300, 3400, 3500 (EXCLUDING 3520 & 3540) 3600, 3800, 3900, 5400	◦ DCME-M30/8MBX /16MBX /32MBX ◦ DCME-M30/8MB /16MB /32MB DCME-M30/CABLE
MICROVAX 3100 MODEL 10, 20 VAXSTATION 3100 MODEL 30, 40	◦ DCME-M31/8MB /12MB /16MB SINGLE CONNECTOR /8MBX /12MBX (MODEL 38, 48 SHOULD ALSO WORK)
11/03, 11/23 11/53, 11/53+ 11/73, 11/73+ 11/83, MicroVAXI, VAXsta I	◦ DCME-Q2A/256 /512 (NON BLOCK MODE) ◦ DCME-Q2B/256 /512 /1MB /2MB (BM) /1MB-NB ◦ DCME-Q4B/512 /1MB /2MB /3.5MB /4MB ◦ DCME-Q4E/1MB /2MB /4MB (ECC) (AS QBUS)
11/73+, 11/83, 11/84 (PMI ONLY)	◦ DCME-Q4E/1MB /2MB /4MB (ECC) (PMI Option)
11/04, 11/24 11/34, 11/40 11/44, 11/45 11/50, 11/55, 11/60	◦ DCME-UNI/1MB

◦ **Continued**

DEC

PDP 11/70	◦ DCME-V75/1MB (ECO REQUIRED)
VAX 11/725 VAX 11/730 VAX 11/750	◦ DCME-V75/1MB
VAX 11/780E VAX 11/785	◦ DCME-V78/1MB /2MB /4MB /8MB (CAN’T USE IN MS780-C BACKPLANE)
VAX 8200, 8250 8300, 8350	◦ DCME-V82/2MB /8 /16 = (VBIC/2MB) CONTROLLER (VBIA/8MB, VBIA/16MB) ARRAY (OBSOLETE)
VAX 8600, 8650	◦ DCME-V86/16MB /64MB (4MB OBSOLETE)
VAX 8500 8530 8550 8700 8800 8900	◦ DCME-V88/16MB /32MB /64MB

HP	
SERIES 9000 MODEL 350, 370	◦ HPME-93P/4MB, /12MB
SERIES 9300 MODEL 360	HPME-360/4MB, /8MB, /12MB, /16MB

IBM	
AS/400 MODEL B10, B20 C10, C20	IMME-42M/4MB, /8MB IMME-42D/4MB
AS/400	
MODEL B30, B35	(FORMERLY IMME-400)
B40, B45, B50,	◦ IMME-A83/4MB, /8MB /16MB
B60	/16MB
B70	IMME-A83/16MB-70
MODEL 50..,55..,65..	◦ IMME-578/2 & 5RA/1, IMME-78P/2MB
MODEL 70-A21	◦ IMME-70A/2MB, IMME-78P/1MB /2MB
MODEL 70, 80	◦ IMME-578/2 /1, IMME-78P/1MB /2MB
65SX	IMME-UPG/4MB /16MB
MICROCHANNEL	
PS/2 50, 50Z, 55SX	◦ IMME-16B/4MB /8MB (16BIT)
MODEL 70, 80	◦ IMME-32B/4MB /8MB /16MB /32MB (32BIT)
RT PC 6150 /20, /25 /125, /A25, /B25, 6151/115 /125 /B25 6151/10 /15	◦ RTRAM/4MB, /8MB

SUN	
SUN 3/E	◦ SNME-3E/4MB /8MB /12MB
SUN 350	◦ SNME-350/4MB /8MB
3/75, 3/110, 3/140, 3/150, 3/160, 3/180	◦ SNXRAM/4MB /8MB /12MB /16MB /20MB /24MB /28MB (SNX12 and SNX28 version artwork)
3/260, 3/280 3/460, 3/470, 3/480 4/260, 4/280	◦ SNX2RAM/8MB /16MB-Z /16MB-D /32MB
SUN SIMMS	
3/60	◦ SNXSM/S1-10, SNXSM, SNXSM/S1, SNX60
3/80	◦ SNXSM/S1-10, SNXSM/S1, /S1-80, /S4-80 WITH PROM 3.0.2
386i/150	◦ SNXSM/S1-10, /S1-80
386i/150XP	◦ SNXSM/S1-80, SNXSM-80, SNXSC
386i/250	◦ SNXSM/S1-80, SNXSM-80, SNXSC
SPARCSta 1, 1+, 2 (4/60, 4/65,) 4/40 IPC	◦ SNXSM/S4-80, SNXSM/S1-80, SNXSM/S1-10
4/20 (SLC)	CPSM-36A/4MB-80
4/110	◦ SNXSM/S1-80, SNXSC
4/330	◦ SNXSM/S1-10, /S4 ◦ SNME-330 /8, /16, /32
4/370, 4/390 4/380	◦ SNXSM/S1-10, /S4

VMEBUS -M MOTOROLA -X CHARLES RIVER DATA	◦ VMERAM/2MB, /4MB, /8MB, /16MB, /512KB
	◦ VMERAM-FP1/4MB, /8MB, /12MB, /16MB, /32MB, /48MB, /64MB
VSB BUS (dual ported w/ VME)	◦ VSBRAM-EC1/8MB, /16MB, /32MB, /64MB
VERSABUS	◦ VERSARAM/2MB, /4MB, /8MB, /16MB
IBM 9000	◦ VERSARAM/16MB, /8MB

Generic Debug

1) Check the board for damage - check all corners, edges, stiffeners, etc for indications of impact or abuse. Check all socketed chips to see if they are loose. Check for bent or broken pins.

2) Try reseating the board. Align it carefully and press it firmly into place. Make sure the unit is flush with the others.

3) If there are cables check to see that they are attached correctly and seated well.

4) Run the diagnostics (system specific - may include dignostics resident in firmware (run automatically on power up, or manually), bootable from hard disk, floppy disk or other media, or run as an application from the operating environment). Check diagnostic LEDs (both system CPU and memory board) if present.

5) Deinstall the product to check if the system boots and runs normally without it. Reinstall it carefully once again to verify that the problem is repeatable.

6) Check the jumpers and/or switch settings.

7) Check the system configuration to verify that it is legal. Check for known configuration bugs.

8) Move the product to a different slot in the same system , or into a different system.

9) Swap a known good board into the system.

Decimal/Hex Equivalents

◦ HEX VALUE	REPRESENTS
800,000	8M
1,000,000	16M
2,000,000	32M
4,000,000	64M
8,000,000	128M
10,000,000	256M
20,000,000	512M
40,000,000	1G
80,000,000	2G

(i.e. for a starting address of 0x41MB, set the switches for 1GB (40,000,000) and 16MB (1,000,000) to the down positions).

◦ @Parent

DNXRAM: April 12, 1990
Diana Bechard (PSE), Phil Schwartz (Design), Joan Tognacci(Tech)

BOARD SIZE: 5" x 5"

VERSION:	TECHNOLOGY:	APOLLO EQUIV:
/1MB	256 Kb DRAM ZIPs	Apollo does not offer a 1MB board
/2MB	256 Kb DRAM ZIPs	A-ADD-2MB (2MB only)

PROCESSORS: DN3000, DN3010
Note: the DN2500 uses DNXSM/S1-10's

CPU ON-BOARD MEM: none

SYSTEM CAPACITY: 8 MB

SLOTS: 4 memory slots, 8 other. Fill the rightmost slots first, using the largest capacity memory modules.

TERMINATOR NEEDED: no

ERROR CHECKING: parity (bit/byte)

JUMPERS: no

DIAGNOSTICS: power up self test, plus the Mnemonic Debugger (MD).

Enter the MD by powering down, place the normal/service switch in the 'service' position, power up, and at the '>' prompt reset the system ('re'), and run the test ('te'). See Chapter 3 in the manual.

'Config' accessed via diagnostics.

Memory Verification:
After logging in run 'netstat'.

TROUBLESHOOTING:
Common Failures:
1) On power up, the screen is blank - check to see that the modules are inserted in the right order (see 'SLOTS:' above), check board seating, and check to make sure the screw has been reinserted in the retaining bracket (see no. 3 below).

2) The customer does not see the full amount of memory - verify that the customer has run the 'config' utility program correctly.

1.2

DNX4RAM: April 17, 1990
Diana Bechard (PSE), Phil Schwartz (Design), Joan Tognacci(Tech)

BOARD SIZE: 5.5"x5" (old versions 7" x 5"?)

VERSION:	TECHNOLOGY:	APOLLO EQUIV:
/4MB-D	1Mb 100ns fast page mode DIPs	A-ADD-4MB-x
/8MB-Z	(obsolete) 1Mb 100ns fast page mode ZIPs	A-ADD-8MB-x
/4MB-Z	(obsolete) same as above, half populated	A-ADD-4MB-x
/S-8MB	1Mb 80ns fast page mode SOJs	A-ADD-4MB-x
/S-4MB	same as above, half populated	A-ADD-4MB-x

* the final suffix for the Apollo equivalent (denoted above by '-x') serves to identify specific versions of the boards. For the DN35x0, the Apollo equivalent has the suffix '-A' denoting 100ns DRAMs (as opposed to 120ns standard). For the DN4500, the Apollo equivalent has the suffix '-B' which denotes 100ns fast page mode DRAMs.

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	
DN3010A*	1	7?	delivered w/ one 4MB module
DN3500	4	7	
DN3550	4	7	
DN4000	4	7	
DN4500**	4	7	requires 100ns DRAMs
DN5500			

* the 3010A has just one slot. If customer installs our 8MB board, the 4MB Apollo board can go into any system except the 4500 (which needs 100nsDRAMs)

** memory boards MUST be interleaved

CPU ON-BOARD MEM: none

SYSTEM CAPACITY:
DN3010A 8MB max
all others 32MB max

SLOT DEPENDENCY: Fill the rightmost memory slots first, using the largest capacity memory modules.

ERROR CHECKING: parity (bit/byte)

TERMINATOR: no

JUMPERS: no

DIAGNOSTICS: power up self test, plus the Mnemonic Debugger (MD). Enter the MD by powering down, place the normal/service switch in the 'service' position, power up, and at the '>' prompt reset the system ('re'), and run the test ('te'). See Chapter 3 in the manual.

TROUBLESHOOTING:
Common Failures:

1) On power up, the screen is blank - check to see that the modules are inserted in the right order (see 'SLOTS:' above), check board seating, and check to make sure the screw has been reinserted in the retaining bracket (also see no. 3 below).

2) The customer does not see the full amount of memory - verify that the customer has run the 'config' utility program correctly.

3) The board won't seat properly - if this occurs on a ZIP version, the problem is likely due to a design flaw on the circuit board. The current rev of the ZIP is AD. On these boards:
a) there should be no silkscreen under the connector at the bottom of the board.
b) the capacitors at the bottom of the board should not have a stiff, thick,white sleeve around them (which interfers with the seating). It SHOULD have a clear sleeve.
c) 'M1' should be stamped on the handle.
d) the connector should be an MX 7990-M, not an AMP connector.
If there is any problem, send a replacement module.

4) On a 4500, the screen is blank (blue if color monitor), possibly with pattern, and the system won't boot - make sure boards are interleaved (add boards in conventional manner, but add TWO boards at a time).

3) The larger boards (8MB) must be installed in the rightmost slots with the smaller boards (4MB) installed in the next available slot to the left. No gaps in the sequence of filled slots.

Known Bugs:
1) Design problem with ZIP version of DNX4RAM. See 'Common Problems' #3.

APME-NTX: September 20, 1989
Diana Bechard(PSE), Phil Schwartz (Design), (Tech)

BOARD DESC: .8" x 3.85" SIMM

VERSION:	TECHNOLOGY:	MFR EQUIV:
/1MB	1Mb SOJs 80ns	

SYSTEMS:
Laserwriter II NTX - 12 slots, 12MB max (fill banks 0->2 in order, 1MB SIMMs first)
IIfx - 8 slots, 32MB max

Note: MacIIfx requires 80ns RAS Access time or faster.

TERMINATOR: none

ERROR CHECKING: none

JUMPERS: none

DIAGNOSTICS:
Laserwriter NTX: power up self test (prints test sheet)
Also check status lights:
flashing green - warming up
steady green (with no other LEDs)- ready to print
flashing red or solid paper jam (red)- check SIMM seating

Memory Verification: during power up. Test sheet includes memory size.

TROUBLESHOOTING:
Known bugs: NTX 6MB of RAM is seen as 5MB by the system

APME-POR August 6, 1990
Jim Stiles(PSE), Scott McAuliffe (Design), Bob Bridges (Tech)

BOARD DESC: SOIC (Small Outline Integrated Circuit) 2.8" x 4.25" x 2.265"

VERSION:	TECHNOLOGY:	MFR EQUIV:
2MB	4Mbit pseudo-static surface mount SOIC*	
4MB		
7MB		
8MB		

*These RAMS draw about 1/4 the battery power per megabyte of 1Mb static RAMS. True static RAM is required for the RAM slot, but not for the Processor Direct Slot(PDS) where our memory resides.

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	MAX MEM CAP:
PORTABLE	2	4	9MB

CPU ON-BOARD MEM: 1MB

SYS REQUIREMENTS: 1MB

MIN MEM INCREMENTS: 1MB

MEMORY BANKS: none

BACKPLANE: Processor Direct Slot, RAM Connector, ROM Connector, Modem Connector

MEMORY SLOTS:
Processor Direct Slot: is where the APME-POR resides.
RAM Slot: uses static RAMs (1MB to 4MB cards) made by Apple. We do not make memory for the RAM Connector.

ERROR CHECKING: no

JUMPERS: yes - W0-W2: Starting Address, W3 preset for testing

Starting Address	Jumpers		
	W2	W1	W0
1MB	DOWN	DOWN	DOWN
2MB	DOWN	DOWN	UP
3MB	DOWN	UP	DOWN
4MB	DOWN	UP	UP
5MB	UP	DOWN	DOWN
6MB	UP	DOWN	UP
7MB	UP	UP	DOWN
8MB	UP	UP	UP

DIAGNOSTICS: power up diags

Memory Verification:
When running the Macintosh operating system, pull down the APPLE menu from the command bar, and select ABOUT THE FINDER. The total memory will be displayed.

TROUBLESHOOTING:

Common Failures:

1) The FINDER box does not recognize all the installed memory. Reinstall board.
2) The screen keeps going blank, and the computer seems to shut down every few minutes. Adjust the sleep delay in the control panel.
3) When you use a particular application on your Macintosh Portable, it seems to slow down after running for a few seconds. Turn off the system rest feature.
4) When opening some applications, you get a message saying that the application can't be opened because the computer is out of memory. Turn either Multifinder or your RAM cache off.
5) Multifinder does not operate correctly: Multifinder requires 2MB of memory which is why many customers have the optional 1MB of memory in the RAM slot in addition to the 1MB of memory on the CPU.

Simple Debugging Options:

1) The Mac Portable battery may need recharging. To recharge the battery, plug in the power adapter.
2) Reset the computer by using the reset and interrupt keys on the side of your computer. Move the locking switch toward the reset and interrupt keys to unlock the keys. Press the reset and interrupt key simultaneously. Release the interrupt key first, then the reset key, to put the computer into system sleep. Slide the locking switch forward again after you have used the keys.

Known Bugs:

- A/UX needs the 68020 processor to run and the MAC Portable uses the 68000. Therefore, A/UX will not run.
- The main battery stays charged for 6 to 12 hours.

INSTALLATION NOTES:
SHUT DOWN: To install the APME-POR disconnect all power to the MAC Portable. This erases RAM disks and unsaved documents, and resets Control Panel and clock settings. Write down all Control Panel settings to reset after the installation. Save all documents. Copy files from the RAM disk to a floppy or hard disk.

Before installing the memory be sure to remove the main battery and replace the battery cover. Replacing the battery cover shuts off the backup battery (9 volt battery), cutting all power to the computer and making it safe to install a card.

OPERATION NOTES:
"System Sleep" allows the computer to operate longer between charges. When the computer goes to sleep, the screen goes blank, and the power used is the power required to maintain the contents of the memory. To wake the computer, press any key on the keyboard. The Mac has no on/off switch. The computer returns to the exact state you left it in when you put it into system sleep.

"System Rest" helps you use battery power efficiently. When you have had no interaction with the computer for 15 seconds, the computer's internal operating speed slows down from 16MHz to 1MHz to conserve battery power.

"Shutdown" ejects any inserted disks, empties the Trash, closes any open applications and documents, and puts the computer into system sleep. Pressing any key restarts the computer, clearing the computer's memory.

MC2RAM: July 2, 1990
Jim Stiles(PSE), Phil Schwartz(Design), George Karpinski(Tech)

BOARD DESC: SIMM (1 unpopulated space on /D's)

VERSION:	TECHNOLOGY:	COMPATIBILITY:
/D	1Mb DIPs-120ns	Mac IIs w/o large disk
/D	-100ns	above, plus w/ accelerator
/S2	256Kb SOJs-120n	Mac IIs OBSOLETE
/S1	1Mb SOJs-120ns	all except ci OBSOLETE
/S1-80	-100ns -80ns	all except ci plus Mac IIci
·/4MB-80	1Mb SOJs-100ns -80ns plus	Mac IIx, IIcx plus Mac IIci

	MEM CAP(MB):		
PROCESSOR:	MIN:	MAX:	
Plus	1	4	
SE	1	4	
SE/30	1	8*	
Mac II	1	8**	
Mac IIx	1	8**	
Mac IIcx	1	8***	
Mac IIci	1	8***	can also use parity SIMMs w/ parity option

*32MB w/ MacOS 7.x. A/UX not available.
** 32MB w/ MacOS 7.x or A/UX. Cannot use convention SIMMs with 4Mb chips.
*** 32MB w/ MacOS 7.x or A/UX.

SLOTS:
Plus and SE - 4 slots (2 banks)
SE/30; Mac II, IIx, IIcx, IIci - 8 slots (2 banks)

ERROR CHECKING: none (optional parity of IIci)

JUMPERS: only on Plus and SE

GENERIC COMPATIBILITY: Note: We DO NOT provide detailed technical support for these configurations. However, our lifetime warrantee still applies.
Network Computing Devices NCD-16
NEXT

DIAGNOSTICS: automatically run on boot up. Single tone indicates system OK. A series of approx 4 tones on a Mac II or a frowning face on a Plus or SE indicate trouble.

TROUBLESHOOTING:
Common Problems:
1) The system does not see all of the memory it should - check that the high density SIMMs are in the correct bank . Also make sure the SIMMs are seated properly.

5.1

CMME-33 June 13, 1990

Diana Bechard(PSE), Phil Schwartz (Design), Joan Tognacci (Tech)

BOARD DESC: Double-sided, with 2 female connectors

BOARD SIZE: 1.625" x 4.5"

VERSION:	TECHNOLOGY:	MFR EQUIV:
/2MB	256Kx4 80ns page mode SOJs	115144-001

	MEMORY:	
PROCESSOR:	SLOTS:	MAX MEM CAP:
COMPAQ 386/33	7	16MB
DESKPRO 486/25		
SYSTEM PRO		

(No additional info on DESKPRO and SYSTEM PRO)

SYSTEM MEMORY BOARD: 2MB reside on a 32-bit System Memory Board. Seven CMME-33/2MB can be plugged onto the System Memory Board (1st module in slot A, 2nd in B, ...G)

SYS REQUIREMENTS: 2MB min

MIN MEM INCREMENTS: 2MB

SLOT DEPENDENCY: System Memory board must be in slot 6.

TERMINATOR: no

ERROR CHECKING: Parity

JUMPERS: no

DIAGNOSTICS: Compaq 33 User Diagnostics
Insert the floppy diskette labelled: "User Diagnostics and SETUP 1 of 2" into drive A and power up. System will boot and execute diags. If a memory error is detected, the failing module will be identified (A, B, C, up to G).

Memory Verification: After power-up, the amount of memory installed will be dispayed at the upper left-hand corner of the screen.

TROUBLESHOOTING:
Common Failures:
1) 164-Memory Size Error (generated while using the setup utility): see CONFIGRATION NOTES:, below.
2) Invalid Memory Configuration:
400000 FE Module
201 - Memory Error
207 - Invalid Memory Configuration
162 - System Options not Set (Run Setup)
Run diagnostics.
3) Memory Size Error while running the Setup utility: The configuration options on the next screen show:
"The configuration options were automatically updated Memory_"
The next screen is a System Configuration summary. This allows you to re-set the memory allocation for the system. At the next prompt, Exit and Reset the system. After the system is reset, the additional memory can be used.

CONFIGURATION NOTES:
- modules must be installed sequentially on the System Memory Board, starting with Module A.

3.2

COMRAM: January 4, 1990
Diana Bechard(PSE), Phil Schwartz(Design), Joan Tognacci(Tech)

BOARD DESC:

VERSION:	TECHNOLOGY:	MFR EQUIV:	
/1MB	256K 100ns DIPs	113131001	
/4MB	1MB 100ns DIPs	113132001	

PROC'R	MAX MEM CAP:	MODULE CONFIRUARTION
286e	16MB	
386/20		Initial memory on card on bus. Max of 3 modules added to the board
386/25		
386/20e		Initial memory on module on mother card. Memory added via card on bus. Max of 2 modules added to card.

* Not compatible in a 386S system

CPU ON BOARD MEMORY: none (on model 20e, a standard module resides on the mother board)

SYS REQUIREMENTS: 1MB

MIN MEM INCREMENTS: 1MB

SLOT DEPENDENCY: /20e Expansion Memory Board - inserts into slot next to disk drive(s). Accepts up to 2 modules.
/20, /25 System Memory Board - inserts into slot 1. Accepts up to 3 modules.

BACKPLANES: /20e
/20, /25 - FLEX Architecture with seperate memory bus

3.2

ERROR CHECKING: parity

TERMINATOR: none

JUMPERS: none

DIAGNOSTICS: Power up system with diagnostics diskette in place. Run 'test' and follow the instructions.

Memory Verification:
If system is powered up with diagnostics diskette in place, the memory size is automatically verified and compared to configuration data. An error is generated if the two differ. Run 'setup' to re-set the configuration data.

TROUBLESHOOTING:
When running diagnostics the following error message appeared: "DMA buffer needs to be relocated". Diagnostics Version 6.01 Rev M caused this failure, the diagnostics Version 6.06 Rev T ran fine.

Check that you have the high and low density modules located correctly with respect to each other.

COMRAM-EX: December 29, 1989
Diana Bechard(PSE), Phil Schwartz(Design), Joan Tognacci(Tech)

BOARD DESC: 4.8" x 13"

VERSION:	TECHNOLOGY:	MFR EQUIV:
/1MB	256K 100ns DIPS	113644-001

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	MAX MEM CAP:
386/20e	1	4	13MB with the COMRAM-EX/1MB

* with a Compaq 4MB expansion card maximum memory is 16MB

CPU ON-BOARD MEM: Standard 1MB module, optional 4MB
There is either a 1MB or 4MB memory module in a special socket on the system board located under the disk drive.

SLOT DEPENDENCY: only 1 32 bit memory slot. This slot is closest to the disk drive.

ERROR CHECKING: Parity

TERMINATOR: No

JUMPERS: No

DIAGNOSTICS:

Insert the COMPAQ DIAGNOSTIC diskette in Drive A. Power up and run the SETUP Utility, followed by the TEST diagnostics.

Memory Verification: At power up the amount of memory installed will be displayed at the upper left corner of the screen.

TROUBLESHOOTING:

164 - MEMORY SIZE ERROR

This error message occurs after the memory installation when the system discovers that the current memory size does not match the previous size. Running the Setup program, the system will reconfigure the memory size.

3.4

CMME-SPM:
Diana Bechard(PSE), Joan Tognacci (Design) October 18, 1990

VERSION:	TECHNOLOGY:
/8MB	4Mb SOJ DRAMS, 80ns Surface Mounted, Both Sides

COMPATIBLE SYSTEMS:
Systempro
Deskpro 386/33L
Deskpro 486/XX

SYSTEM MEMORY CAPACITY:
Systempro: 128 MB
Deskpro: 52MB

MEMORY CONFIGURATION for SYSTEMPRO:
System Expansion Slots: 11
Memory expansion cards reside in slots 8,9&10 only. Slot 8 is reserved for System Memory Board.

Memory Slots on Expansion Board: 7 (A through G)
The memory must be installed in sequential order on the memory expansion board (i.e. the first module is installed in slot A, the second module is installed in slots B, etc)

ERROR DETECTION: Parity

JUMPERS: None

March 23, 1990
DCME-D31:
Chris Martel(PSE), Phil Schwartz(Design), George Karpinski(Tech)

BOARD DESC: Double-sided SIMM

VERSION:	TECHNOLOGY:	MFR EQUIV:
/2MB	1Mb x 1Mb SOJ Drams	S01-AA/NN

PROCESSOR: DECStation 3100; DECStation 2100; (MIPS RISC CPU)
DECSystem 3100

SYSTEM CODE NAME: PMAX

OPERATING SYSTEM: ULTRIX (no VMS)

CPU ON-BOARD MEM: none

SLOTS: 12 SIMM Slots reside on system board, install 2 SIMMs at a time
SIMM slots are numbered:
BANK A: 1,3,5,7,9,11
BANK B: 2,4,6,8,10,12

◦ **BANK CONFIGURATION SLOT ASSIGNMENT**

SYS REQUIREMENTS: 8MB

MIN MEM INCREMENTS: 4MB

MAX MEM CAP: 24MB

ERROR CHECKING: parity

JUMPERS: none

DIAGNOSTICS:

ROM diagnostics:

```
>>>t m
```

The test 't m' writes and reads many different patterns in memory and tests the memory logic. If there is a failure, the diagnostic will display the defective SIMM number.

```
>>>t b
```

The test 't b' does a SIMM by SIMM test for bad pages.

Memory Verification:

After self-test, the total amount of memory installed is displayed.

```
KN01  V.6.5
7..6..5..4..3..2..1..0
xxMB..........0
```

TROUBLESHOOTING:

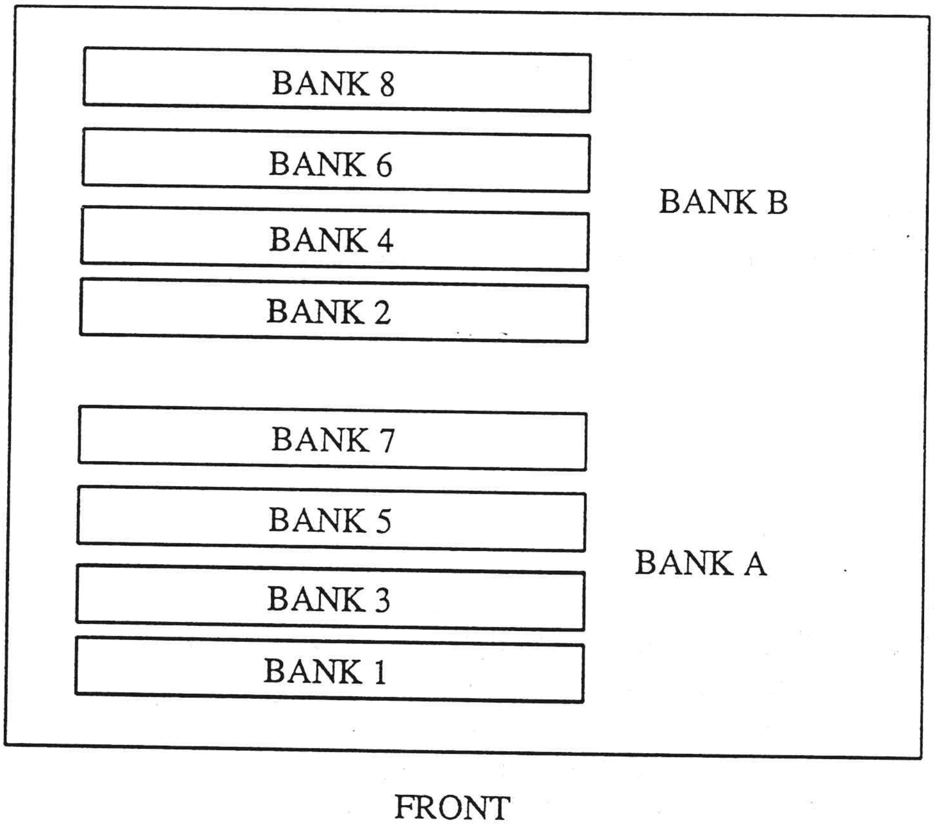
Common Failures:

DEC has two different types of SIMM connectors. Most of the systems use the MOLEX connectors #78824, which are black. Some systems have AMP connectors, which are white. With the MOLEX connectors the SIMMS have to be within spec. If they are 1 mil out of spec, this may cause the diagnostics and systems to fail. The AMP connectors allows the SIMMS to be 4 mils out of spec.

INSTALLATION NOTES:

SIMMS must be installed in pairs (to accommodate the 32 bit wide memory bus) and installed in consecutive numbered slots. i.e. In the first location in Bank A (slot 1) AND in the first location in Bank B (slot 2).

BANK CONFIGURATION



DCME-D52

Chris Martel (PSE), Phil Schwartz (Design) October 11, 1990

VERSION:	TECHNOLOGY:
/8MB	1Mb SOJ DRAMS, 100ns, Surface Mounted, Both Sides
/32MB	4Mb SOJ DRAMS, 100ns Surface Mounted, Both Sides

PHYSICAL SIZE: 7.78" by 2.47" LOW PROFILE: 7.78" by 1.235" (8MB)

MAXIMUM MEMORY CAPACITY:
/8MB - 120MB
/32MB - 480MB (requires Ultrix Rev 4.0)
Note: System can reach 512MB with Rev 5.0
System must have ROM Version 5.3 to use 32MB boards

TOTAL NUMBER OF MEMORY SLOTS: 15

SLOT DEPENDENCY: Slot zero must always have a memory board installed. 32MB memory modules must be installed in front of 8MB boards. Installing the memory. It is recomended that the customer fill the numbered memory slots starting with the lowest number (at the rear of the unit, slot 0 and working up to the highest number, slot 14).

COMPATIBLE SYSTEMS:
DEC Station 5000 CX-200
2D and CASE Applications/CAD
DEC Station 5000 PX
Custom Graphics Co-Processor 1280x1024
DEC Station 5000 PXG
Low Cost 3D
DEC Station 5000 PXG Turbo
High Cost Graphics. Two Graphics Cards with Turbo Bus

ERROR DECTECTION: ECC

JUMPERS: None

DIAGNOSTICS:

The DEC ROM for your unit is programmed with various base level diagnostics including memory diagnostics to help determine defective array cards.

Turn on the system unit. As soon as the system powers up, the ROM will proceed through the basic diagnostics. Once completed, the monitor will show the system prompt >>

Confirm memory is operating. At the system prompt, enter Test f. If any memory is not working, an error message will appear.

Verify memory size. At the system prompt, enter Cnfg f. The system will respond with the total amount of memory installed and recognized, and it will list which slots have memory in them.

Example:
For one 8 MB board in the first slot (slot 0) , the message will appear:

```
   BSys-[systype=0x82020120]
              Mem: 8388608 bytes (8M)
              Simm#s: 0
```

RAM Board Test:

Note: For ROM Rev 5.3 and Greater

The Ram board test checks the operation of individual memory modules. This test is lengthy and can take several minutes for each memory module tested.

To run a RAM board test on all memory modules, type **t 7/mem** * and press Return. The system then tests each memory module separately.

To run a RAM board test on a single module, type **t 7/mem *board*** and press Return. When you type this command, replace ***board*** with the slot number of the memory module you want to test. RAM board test error messages use the format ?TFL 7/mem/*code*: board (x: description).

-- The string ?TFL 7/mem indicates that the RAM board test failed.

-- *code* is a number that indicates which part of the RAM board test failed

--*board* indicates the memory module that reported the problem. The number after *board* is the slot number of the memory module that reported the error.

--*description* represents additional information that describes the failure

TROUBLESHOOTING:

If a self test reports an error code that includes mem, the problem is in a memory module. The additional information statement in the error message lists the slot number of the memory module that reported the problem.

Memory Module Slot Number	Memory Address Range for 8MB Modules
0	a0000000 to a07FFFFF
1	a0800000 to a0FFFFFF
2	a1000000 to a17FFFFF
3	a1800000 to a1FFFFFF
4	a2000000 to a27FFFFF
5	a2800000 to a2FFFFFF
6	a3000000 to a37FFFFF
7	a3800000 to a3FFFFFF
8	a4000000 to a47FFFFF
9	a4800000 to a4FFFFFF
10	a5000000 to a57FFFFF
11	a5800000 to a5FFFFFF
12	a6000000 to a67FFFFF
13	a6800000 to a6FFFFFF
14	a7000000 to a77FFFFF

Known Bugs:

If the system has both 8MB and 32MB memory boards, Ultrix will only recognize the first 8MB board that follows the last 32MB memory module.

Example:

Slot 0 32MB
Slot 1 32MB
Slot 2 32MB
Slot 3 8MB
Slot 4 8MB }
Slot 5 8MB } Not Recognized by Ultrix

Note: The PROM will see all the memory, but will only be able to test the memory individually. Typing *t 7/mem ** will fail. You must tell it the slot number you want it to test.

4.3

DCME-M02: MV2RAM June 13, 1990
Chris Martel(PSE), Lou Bezdek(Design), Scott Manna(Tech)

BOARD SIZE: DEC quad height, DEC dual height

VERSION:	TECHNOLOGY:	DEC EQUIV:
/8MB-D *	1Mb DRAM DIPs	MS630-AA
/2MB	256Kb DRAM DIPs, half pop	MS630-BA
/4MB	256Kb DRAM DIPs	MS630-BB
/8MB	256Kb DRAM ZIPs	MS630-CA
/16MB	1Mb DRAM DIPs	one

* dual height

also DCME-M02/CABLE (3 position cable for memory bus)

SYSTEMS: MicroVAX II and VAXStation II

CPU ON-BOARD MEM: 1MB (disabled when 16MB is installed)

MAXIMUM MEMORY CAPACITY: 16 MB

BACKPLANES: BA23 and BA123

SLOT DEPENDENCY: must be in slots 2 and 3 (memory bus runs over 50 pin ribbon cable to CPU in slot 1)

ERROR CHECKING: parity (bit/byte)

TERMINATOR: no

JUMPERS: none (auto-configured)

DIAGNOSTICS: start up self test, and MVII DIAGNOSTICS CUST (RX50# for floppy disk, or TK50 for cart tape). See chapter 3 in manual.

From VMS:

```
Show Error
Show Mem
Analyse/error_log/since=dd-mmm-yyyy/include=mem
```

(i.e. 19-oct-1989)

TROUBLESHOOTING:

Common Problems:

1) Part of the memory is not being seen/used - run autogen (see Section 2.4 of the manual)

2) System fails to boot because of a double bus error (error message "?12 DBL_ERR") - check to make sure you have not exceeded the system capacity (i.e. a 16MB and an 8MB board).

3) The system can't find some of the Q bus boards - check that bus grant continuity has been maintained on the backplane (see section 2.3, item 10).

Possible memory failures may be caused an unshielded cable. DEC has introduced a 50 pin, 3 connector cable for the µVAXII memory. If a customer is having memory problems and wishes to obtain a shielded cable. They can call DEC Spares in New Hampshire (603) 884-5000 or they can obtain one from DEC field service.

- under MicroVMS 4.1 and 4.2, inaccurate bad pages data may be displayed. For better info, log in as the system manager, and run 'analyse/system' and 'show pfn/bad' for an accurate listing of bad pages.

2/3

CONFIGURATION NOTES:

1) Memory boards MUST be in proper memory slots - the two slots behind the processor (marked M7606).

2) You cannot skip a slot when installing memory.

3) The same applies for regular Q-Bus slots - you cannot skip any slots (although you can use a bus grant continuity card).

4) Dual height boards (8MB-D's) MUST go into CD connectors in a memory slot. They MUST NOT be placed in any Q-Bus slots (the CD connectors are for memory in slots 2 and 3). Except for these and the CPU slot, the rest of the slots - on both the AB and CD sides of the backplane - are Q-Bus slots.

5) Quad-height non-memory boards can be installed in slot 3 as long as it is not needed for memory.

DCME-M20: MV2000 June 27, 1990
Chris Martel(PSE), Lou Bezdek(Design), Paul Lola(Tech)

BOARD DESCRIPTION: 4.625" X 8", plus optional ROM adaptor. Very old versions of the board have a ROM adaptor card which does not have a flat cable - it plugs directly into the ROM socket.

VERSION:	TECHNOLOGY:	
/8MB	1Mb DRAM SOJ's	Populated on one side only.
/16MB	1Mb DRAM SOJ's	Populated on both sides

PROCESSORS: MicroVAX 2000, VAXStation 2000

CPU ON-BOARD MEM: 2MB

SYSTEM CAPACITY:
2MB
10MB with /8MB
16MB with /16MB
NOTE: ROM adapter cards for 8MB and 16MB are different
(label is on ROM connector board)

TERMINATOR: none

ERROR CHECKING: parity

JUMPERS:
D - board size jumper: installed on lower 2 pins for 8MB, not installed on 16MB

A, B, and C - ROM jumpers (jumpers are only installed when ROM adapter is NOT used).

Size	Install jumpers on
8MB	A and C
16MB	A, B, and C

DIAGNOSTICS: power up self test. If system diagnostics run without error, system will auto boot (test B is for memory).

Power up self test: Hex digits countdown from F to 1.
... device OK or soft error
?.. hard error on device
_.. device not tested (installed?) - devs 4-1 only
*.. ROM is bad - devs 4-1 only
all errors summarized after:
'??' indicates hard error
'?' indicates soft errors or status message
normal status messages have no such notations
xxxx.0001 indicates no error
To redisplay results from power up tests type 'test 50' at monitor prompt.
For more details see VAXstation 2000 Maintenance Guide (Nate

From VMS:
Show Error
Show Mem
Analyze/error_log/since=dd-mmm-yyyy/include=mem
(i.e. 19-oct-1989))

Memory Verification: Enter 'SHOW MEM/PHYS' at the VMS prompt.
See section 3.3 in the manual for details.

TROUBLESHOOTING:

Common Failures:

1) After installing the new memory and booting, the system doesn't show enough memory: The problem is likely that when the system did a self test, it found memory errors and blocked out some portion of memory. Run 'show errors' to find the errors, and do basic board swapping to isolate the problem.

2) no airflow, or system dies after awhile and is OK after cooling off - the problem is likely a cable (the ethernet cable?) jamming the fan. Just relocate the cable and the system should be fine.

3) BLANK SCREEN ON POWER UP:
Check if the the ROM Adaptor Card was used. If so, check if the DEC ROM was installed into the Clearpoint ROM Adaptor board. Verify that the ROM was inserted correctly and that all pins were making contact.
If the ROM Adaptor Card was not used, verify that all of the jumpers are set properly on the memory card.
If the customer is using a Printer Cable, check that it is the correct cable. BC005 for the Microvax 2000 or Vax 2000. Printer Cable, BC008 for the VAX 3200 system will not work.

4) SYSTEM ONLY RECOGNIZES 2MB:
If the system only sees 2MB, it is only seeing memory on the motherboard. Verify that the Board Size Jumper at location D is set properly. If the jumper is correct and the system still only recognizes 2MB. Have the customer reseat the memory.
Verify that the customer has changed the memory configuration by running autogen.

Simple Debugging Options:

1) Make sure that you understand the ROM version and its implications. At the console prompt ('>>>') type 'E/U 2007FFFC<CR>'.

If it returns: BAE35EE0, C7921F20, or C7791F89
it DOES require the ROM adapter card and NOT jumpers A,B, or C. (these checksums are for older ROMs).

If it returns: F4E252B1, 00C173B0, 1DC49624, or EA31B808
it DOES NOT require the ROM adapter card and DOES require jumpers on A and C, and possibly B.

If the checksum value is not one of the above AND the machine was recently shipped from DEC, assume that it DOES NOT require the ROM adapter and DOES require appropriate memory size jumpers.

2) Check for bad ROM board. Don't install the ROM board and jumper to memory array board to look like either 2 or 4MB. These sizes don't require the ROM regardless of what the checksum is.

Size	Install jumpers on
2MB:	'B'
4MB:	'A' and 'B'

Known Bugs:

Ethernet chip "LANCE CHIP" AM7990 DC/70
Located on DEC ethernet controller card.
Causes system not to boot, or if system does boot it will not run for a prolonged period of time.

Have DEC replace the lance chip with a different date code. If DEC is not agreeable to do this, we will send them a Lance Chip under a "T" RMA. The Clearpoint part number is: IICL-7990.

INSTALLATION NOTES:

If a Clearpoint upgrade is in place, the ROM checksum reported the E/U command will be meaningless

21.5

DCME-M30: MV3000 June 9, 1990
Chris Martel(PSE), Scott McAuliffe(Design), Scott Mannna(Tech)

BOARD SIZE: Quad height (Q Bus)

VERSION:	TECHNOLOGY:	DEC EQUIV:
NONE-GATE ARRAY		
/8MBX	256KB ZIPs	MS650-AA, AF
/16MBX	1MB DIPs (socketed)	MS650-BF
/32MBX*	1MB DIPs (mother) 1MB SOJs (daughter)	

VERSION:	TECHNOLOGY:	DEC EQUIV:
GATE ARRAY		
/8MB	1MB DIPs - half pop	MS650-AA, AF
/16MB	1MB DIPs	MS650-BF
/32MB	unpopulated (mother) 1MB SOJ (daughter)	

*This assembly requires 1 inch slot, so it will work in a 3200.

/CABLE	5 position cable for VAX3500, 3600, 3800, 3900
DCDG-M30	diagnostic for all M30's (TK50/70 and floppy media)

PROC:	CPU: MEM:	MEM: SLOTS:	MAX: MEM:	CHASSIS: (SLOT SIZE)
3200	none	2	64MB	BA23 (1/2 inch)
3300	4MB	3	52MB	BA215 (1 inch)
3400	4MB	3	52MB	BA213 (1 inch)
3500	none	4	64MB	BA213
3520 3540	NOT COMPATIBLE			
3600	none	4	64MB	BA213/H9644
3800	none	4	64MB	BA213 8MB card not supported
3900	none	4	64MB	BA213/H9644 8MB card not supported
5400	none	4	64MB	

*Memory must be contiguous, residing in the slots closest to the CPU

The maximum board equivalents that can be installed in these systems is 4. A 32MB card has two board equivalents. So if the customer installs a 5th board select, the system won't see it.

SLOT DEPENDENCY: Memory must go into a special memory slot. Memory size is not slot dependent.

ERROR CHECKING: EDC/Parity

TERMINATOR: none

JUMPERS (installed at factory):
8MBX - W1, 2, 4, 6, 8 installed
16MBX - W2, 4, 6, 8 installed
32MBX - W3, 5, 7 installed

8MB - W1, 4-12 installed. W3 up.
16MB - W1, 2, 4-12 installed. W3 up.
32MB - W1-9, 14 installed. W10 down.

- ◦ NEW JUMPER SETTINGS 32 & 16MB:
- ◦ NEW JUMPER SETTINGS 8MB:

DIAGNOSTICS: Includes power up self test and Clearpoint diagnostics. Clearpoint diagnostics SOLD SEPARATELY on TK50/70 tape and floppy media.

From VMS:
Show Error
Show Mem
Analyse/error_log/since=dd-mmm-yyyy/include=mem
(i.e. 19-oct-1989)

Memory Verification:

```
$ SHOW MEMORY/PHYS
```

The value in parentheses after 'Main Memory' is the amount seen by the system and should agree with the sum from the installed memory boards.

DCO FOR DCME-M30:

The DCME-M30s violate DEC 's patent "self-testing memory boards." The product was designed to run in an alternate mode incase such a patent was granted. The purpose of this DCO is to test the alternate mode operation before we release an ECO to production. The alternate mode of operation will not violate the patent.

New Jumper Settings:
- In a system with both DEC and Clearpoint boards the Clearpoint boards must be located closest to the CPU.
- The "first" board is defined as the Clearpoint board in the slot closest to the CPU.
- The "last" board is the Clearpoint board located the farthest from the CPU.
- The "Middle" boards are defined as any Clearpoint board between the "first" and the the "last" boards.
- If there is only one Clearpoint board it should be considered the "first" board.

BOARD	JUMPER	FIRST BOARD	MIDDLE BOARD	LAST BOARD
32MB	**W1**	**IN**	**IN**	**OUT**
	W2	**OUT**	**IN**	**IN**
	W3	**OUT**	**IN**	**IN**
	W4	**OUT**	**IN**	**IN**
	W5	**OUT**	**IN**	**IN**
	W6	**IN**	**IN**	**OUT**
	W7	**IN**	**IN**	**OUT**
	W8	**IN**	**IN**	**OUT**
	W9	**IN**	**IN**	**OUT**
	W10	**UP**	**DOWN**	**DOWN**
	W14	**OUT**	**OUT**	**OUT**
16MB	**W1**	**OUT**	**OUT**	**OUT**
	W2	**IN**	**IN**	**IN**
	W3	**DOWN**	**UP**	**UP**
	W4	**IN**	**IN**	**OUT**
	W5	**IN**	**IN**	**OUT**
	W6	**IN**	**IN**	**OUT**
	W7	**IN**	**IN**	**OUT**
	W8	**IN**	**IN**	**OUT**
	W9	**OUT**	**IN**	**IN**
	W10	**OUT**	**IN**	**IN**
	W11	**OUT**	**IN**	**IN**
	W12	**OUT**	**IN**	**IN**

TROUBLESHOOTING:

Common Failures:

1) The bus grant continuity must be maintained throughout the backplane. There cannot be any empty Q connector sockets between the CPU and the last board. Grant continuity modules must be used to fill empty Q connector sockets (this should not normally be an issue with a memory-only installation).

Known Bugs:

1) Test 11 runs slower with Clearpoint MBX boards than with DEC's because these boards do not have the gate array. Although self-test runs slower, its regular performance is comparable to DEC's memory (Clearpoint boards that use the gate array run self-test as fast as DEC's).

2) DEC's boards and Clearpoint's gate array boards pass self-test so quickly that the disks are not spun up and ready for booting. The customer has to reset the system to autoboot or type "B device" manually.

CONFIGURATION NOTES:

- DCME-M30/32MBX is a double-width (1 inch) board which will not fit into the single-width (1/2 inch) slots of the MicroVAX 3200.

- The 32 MBX and 32MB are logically equal to two 16MB boards (one RAS line is apparently needed for each 16MB of mem).

- The MicroVAX 3XXX K650 Processor REV E1 does not run with the DCME-M30/xxMBX memory boards. When booting the system, the following error message will be displayed:

```
 Modified MS650AA must be present
?0A.A1  [registers]
```

The customer needs the DCME-M30/xxMB boards.

- VAXStation 3520 and 3540 models have coprocessors for 3D graphics. As noted above, Clearpoint memory will not work in them at present.

BOARD	JUMPER	FIRST BOARD	MIDDLE BOARD	LAST BOARD
8MB	W1	OUT	OUT	OUT
	W2	OUT	OUT	OUT
	W3	DOWN	UP	UP
	W4	IN	IN	OUT
	W5	IN	IN	OUT
	W6	IN	IN	OUT
	W7	IN	IN	OUT
	W8	IN	IN	OUT
	W9	OUT	IN	IN
	W10	OUT	IN	IN
	W11	OUT	IN	IN
	W12	OUT	IN	IN

DCME-M31: June 18, 1990
Bob Mulcahy(PSE), Phil Schwartz(Design), Scott(Tech)

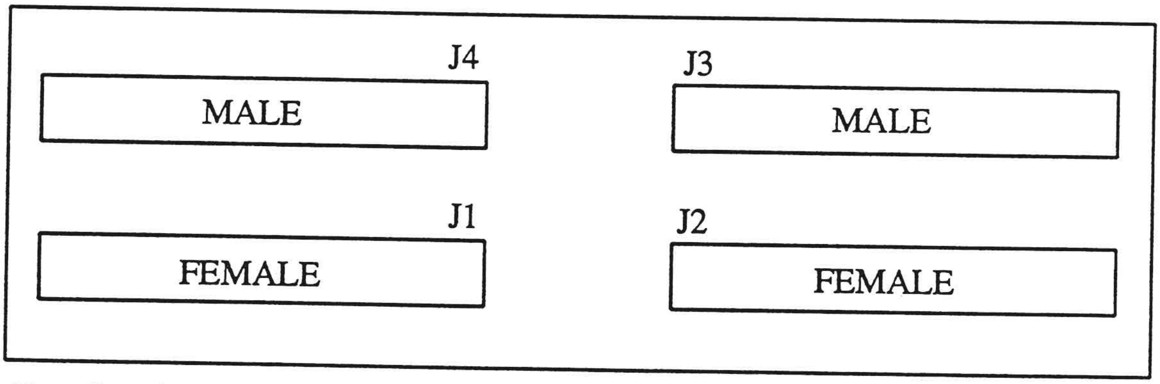
BOARD DESC:

VERSION:	TECHNOLOGY:	MFR EQUIV:
/8MB	1Mb 100ns page mode SOJs	MS42-KA
/12MB		MS42-BA (can't use daughter)
/16MB		MS42-CA
/8MBX		NOTE: MBX uses single connector to allow stacking with the DEC 8MB and 16MB memory
/12MBX		

DEC also offers two 4MB versions - MS42-AA and MS42-AB

MB versions (and DEC 8MB and DEC 16MB) have both female connectors and male connectors. The 8MB & 12MB with the double connectors interfer with components on the DEC 8MB and 16MB memory boards. MBX boards were designed to resolve this problem.

MBX versions (and DEC 4MB and 12MB) have only female connectors. We do not make a DCME-16MBX board.



Two female connectors, J1 and J2, or two male connectors, J3 and J4, are considered one logical connection between memory devices.

CLEARPOINT PRODUCT	COMPATIBLE WITH CLEARPOINT	COMPATIBLE W/ DEC
DCME-M31/8MB	8MB, 12MB, 16MB 8MBX, 12MBX	4MB, 12MB
DCME-M31/12MB	8MB, 12MB, 16MB 8MBX, 12MBX	4MB, 12MB
DCME-M31/16MB	8MB, 12MB 8MBX, 12MBX	4MB, 12MB
DCME-M31/8MBX	8MB, 12MB, 16MB	8MB, 16MB
DCME-M31/12MBX	8MB, 12MB, 16MB	8MB, 16MB

PROCESSOR: VAXStation 3100, models 30,38 and 40; MicroVAX 3100, models 10 and 20

CPU ON-BOARD MEM: 4MB

SYS REQUIREMENTS: 8MB for 3100/30; 16MB for 3100/40

MIN MEM INCREMENTS: 4MB

MAX MEM CAP: 32MB

ERROR CHECKING: parity

TERMINATOR: none

JUMPERS: none

MEMORY BANKS: none

BUSSES: memory array bus (unique and proprietary); SCSI (uses non-standard connector)

DIAGNOSTICS: Powerup diagnostics:
test all system components. Memory is managed in 4MB sections. If failing memory is in high memory, total memory available is reduced. If failing memory is in the middle, a hole in memory is reported. (It is unclear at this time how this hole is managed by VMS or Ultrix).

Powerup diagnostics messages:
F...E...D...C...B...A...(and so on)

3 dots indicate test passed
_ indicates missing option
? indicates soft error
* indicates bad ROM

If an error is detected during test, an additional message is displayed. For soft memory errors it will begin with one question mark and two question marks to indicate a hard error. This will be followed by 'B' (the number of the memory test) and then by some additional information (see detailed documentation -- VAXstation 3100 Maintenance Information). For Example:

```
          F...E...D...C...B...A...9(and so on)

?? B        0010.0020
01000000 00000003
```

The first line indicates a hard memory error ('?? B') followed by the number of megabytes of memory (the hexadecimal numbers to the left of the decimal point) and an error code (the numbers to the right of the decimal point). The error codes are:

.0001	No error
.0002	Failure in test address routine
.0004	Byte Mask failure
.0008	Data/address test failure
.0010	No memory was found during sizing
.0020	Unexpected parity error

The second line contains:

- how much memory is installed. In the example above, there is 16MB (01000000)
- where the error occurred. Each bit in the second number corresponds to 4 MB of memory - the low order bits in this number corresponding to low order memory addresses. This example is indicating that there is an error somewhere in the first 4MB of memory (memory which resides on the system board).

Additional Tests (from ROM diagnostics):

Simple memory test:

```
>>> test b
```

This executes the same memory test which is executed during the power up diagnostics.

Complex System test:

```
>>> test 0
```

This test is called the Customer mode system exerciser. It tests as many of the system components as possible without writing on disks or requiring loop back connectors on the serial ports.

```
>>> test 101
```

This test is called the Field Service mode system exerciser. It is like the above test, but it does write onto disks and tapes and requires loop back connectors on the serial ports.
NOTE: Only specially formatted disks and tapes will work with this test.

```
>>> test 102
```

This is like the above test, but runs continuously rather than just twice.

From VMS:

```
Show Error
Show Mem
Analyse/error_log/since=dd-mmm-yyyy/include=mem
```

(i.e. 19-oct-1989)

Memory Verification:

```
$ SHOW MEMORY/PHYS
```

The value in parentheses after 'Main Memory' is the amount seen by the system and should agree with the sum from the installed memory boards.Also, from console:

```
>>> show memory
```

For an 8MB board, this will return (in HEX):

```
00800000          the height address
00000000          the low address, and
007fd400:007fffff   the memory block where ROM diagnostics
have been loaded
```

TROUBLESHOOTING:

Common Failures:

1) Check to see if board is in backward. It is possible to rotate the board 180 degrees and force it to seat. Does not seem to cause any damage to the board or the system.

2) If there is a blank screen on power-up this means the CPU ROM cannot load the diags high memory. This could be caused by the board being put in backwards. Make sure the board is put in correctly.

DCME-Q2A: QRAM-11A March 7, 1990
DCME-Q2B: QRAM-11B, QRAM-44B
Diana Bechard(PSE), Lou Bezdek(Design), Robert Clancy(Tech)

BOARD DESC: Dual height DEC

VERSION:		TECHNOLOGY:	MFR EQUIV:
Q2A	256KB	64Kb DIPs, half pop	
	/512KB	64Kb DIPs, full pop	
Q2B	/256KB	64Kb DIPs, half pop	MSV11-LK
	/512KB	64Kb DIPs, full pop	
	/1MB	256Kb DIPs, half pop	MSV11-MB/FN
	/2MB	256Kb DIPs, full pop	MSV11-SA/FN

Block mode transfer capability is provided on Q2B models. It can be disabled on Q2B models by a special ECO.

DEC EQUIVALENTS: MSV11-DC(16K), -DD(64K), -DE(64K), -LK(256K), -MA(512K), -MB(1M), -SA(2M)

PROCESSORS: 11/03(Q2A), 11/23, 11/53, 11/53+, and 11/73. Also 11/73+, 11/83, and uVAX I

MAX MEM CAP: 4MB

CPU ON-BOARD MEM: 11/53 (512KB), uVAX I w/graphics (512KB)

SLOT DEPENDENCY: recommend installation as close as possible to CPU, but should work in any slot

TERMINATOR: none

ERROR CHECKING: parity

JUMPERS:

Q2A:

J00-06 - starting address - must be set on 32 KB boundaries
J07-09 - CSR address - must be unique for every memory board
J10 - addressing mode (18/22 bit) select
J11-13 - battery backup - not normally implemented
J14-15 - board size
J16 - I/O page select
J17 - CSR bit 14 select

Q2B:

J01-04 - starting address - any boundary that is a multiple of the board capacity
J05-09 - board size
J10-12 - CSR address - must be unique for every memory board
J13 - addressing mode (18/22 bit) select
J14-16 - battery backup - not normally implemented
J17 - floating point

◦ BOARD LAYOUT and JUMPER SETTINGS

DIAGNOSTICS:

MAINDEC-11 CVMSA (for systems using 22 bit addressing)
MAINDEC-11 CZKMA (for systems using 18 bit addressing)
Memory Verification:

TROUBLESHOOTING:

Simple Debugging Options:

1) Check the parity LED (it will be on if any memory errors have been detected).

2) If you think you may have an error in high order memory, you can try bypassing this memory by using the sizing jumpers.

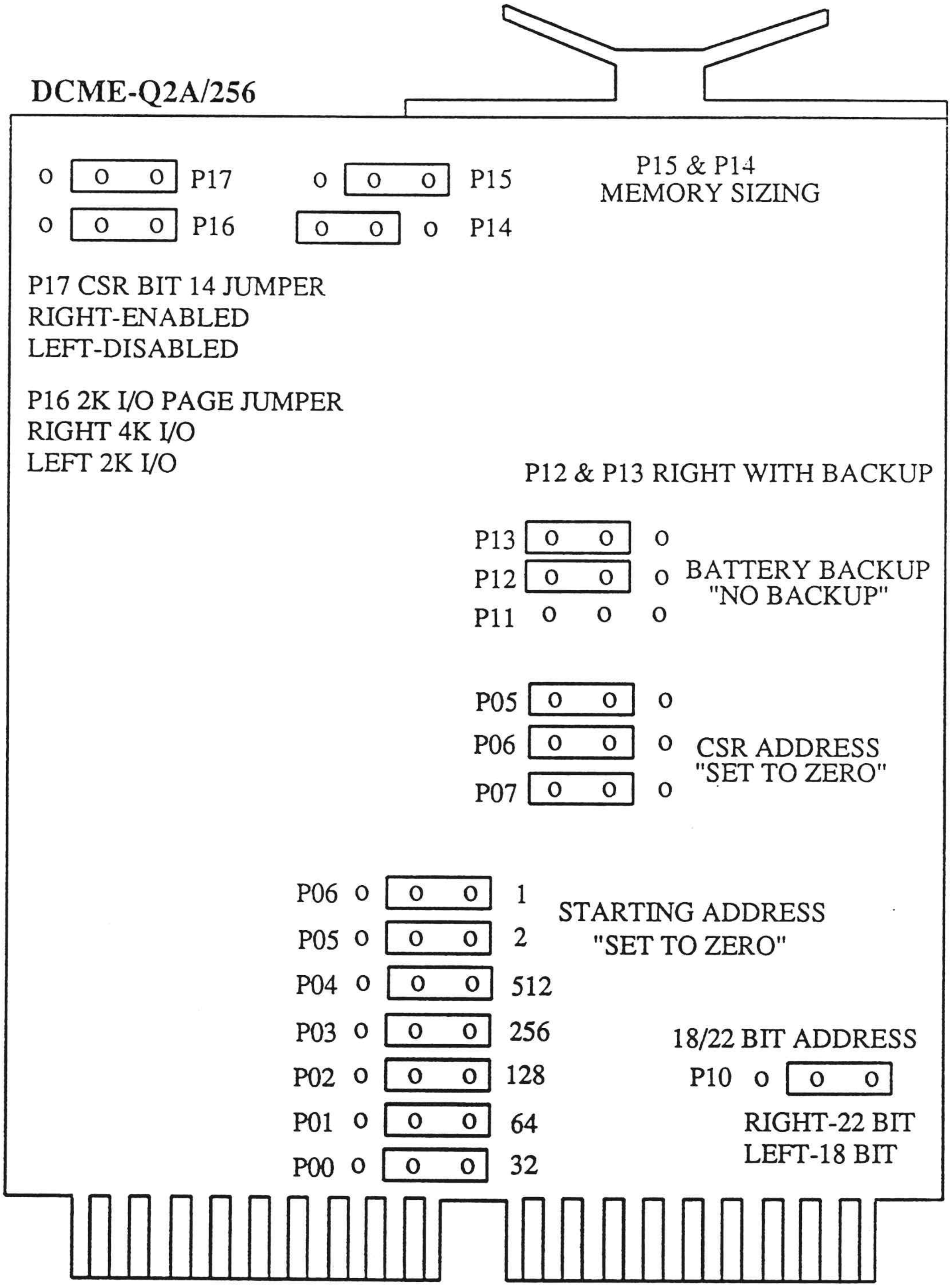
CONFIGURATION NOTES:

- If the processor is an 11/53 and a Q2B is being installed, our board must be either 256 or 512KB since there is already 512KB on board the processor (with Q2B's, the existing memory must be a multiple of the memory being added)

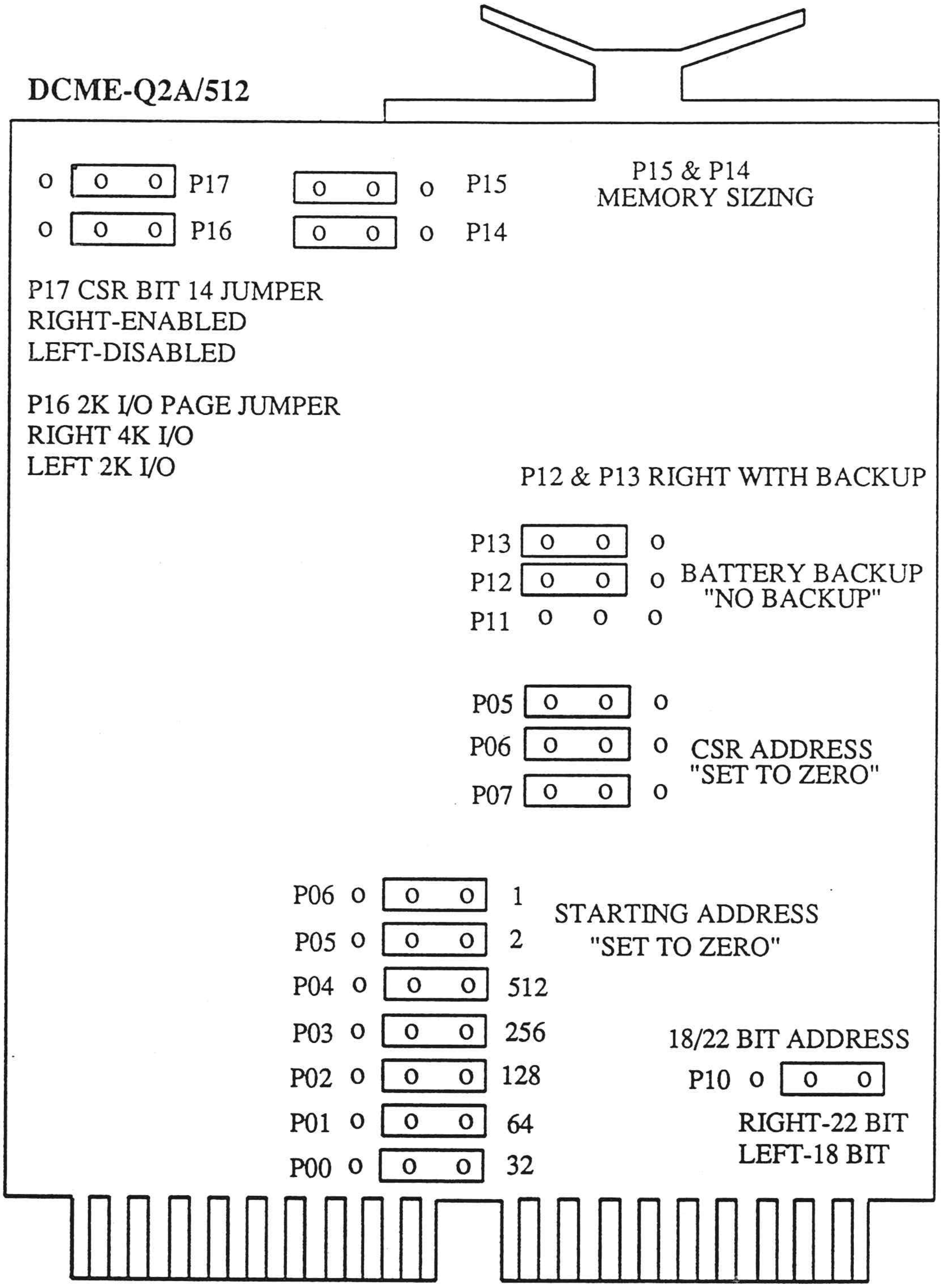
- Jumper J17 (floating point) is not implemented on Rev CD boards

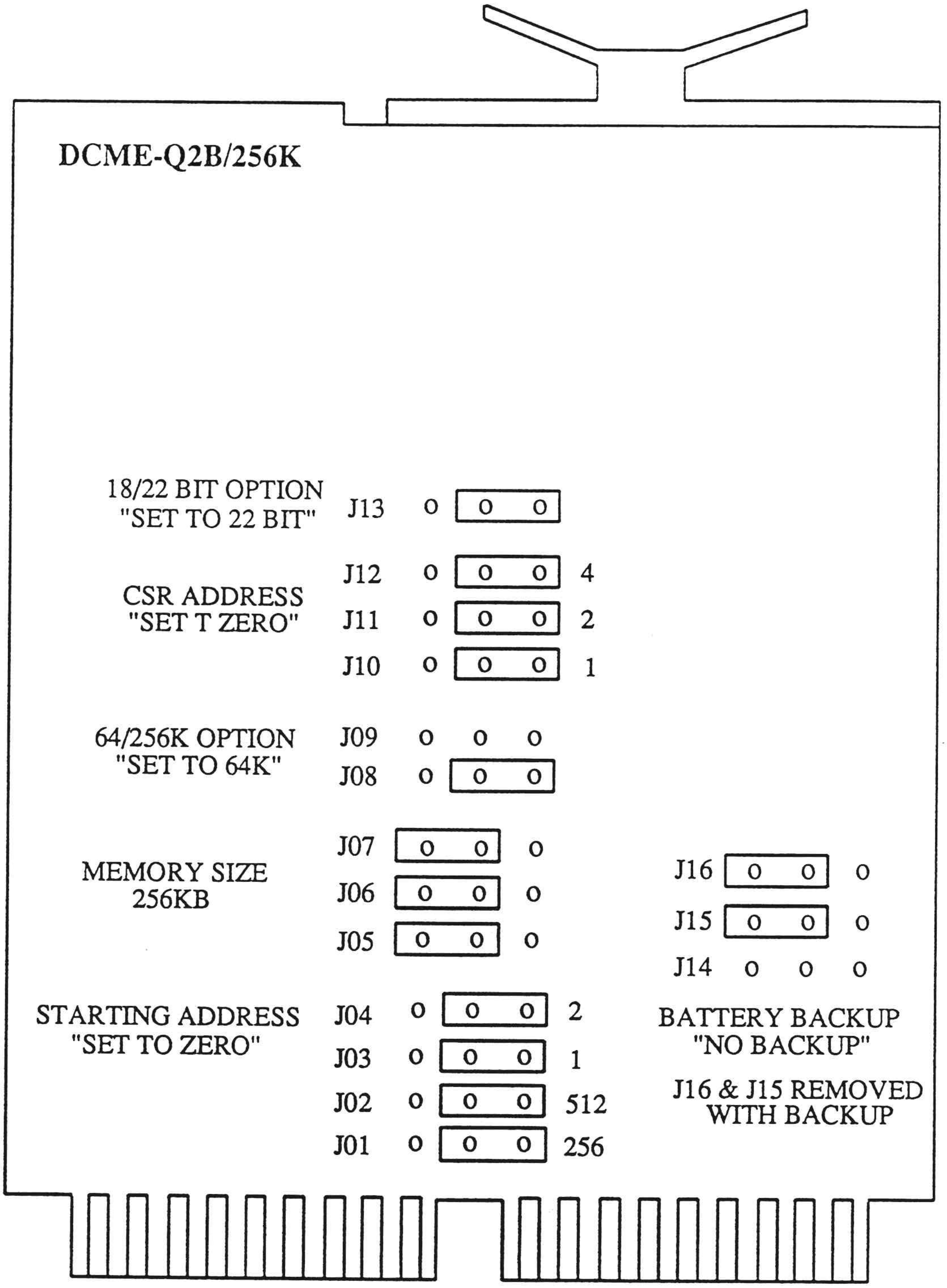
- Disable parity by removing the CSR jumpers

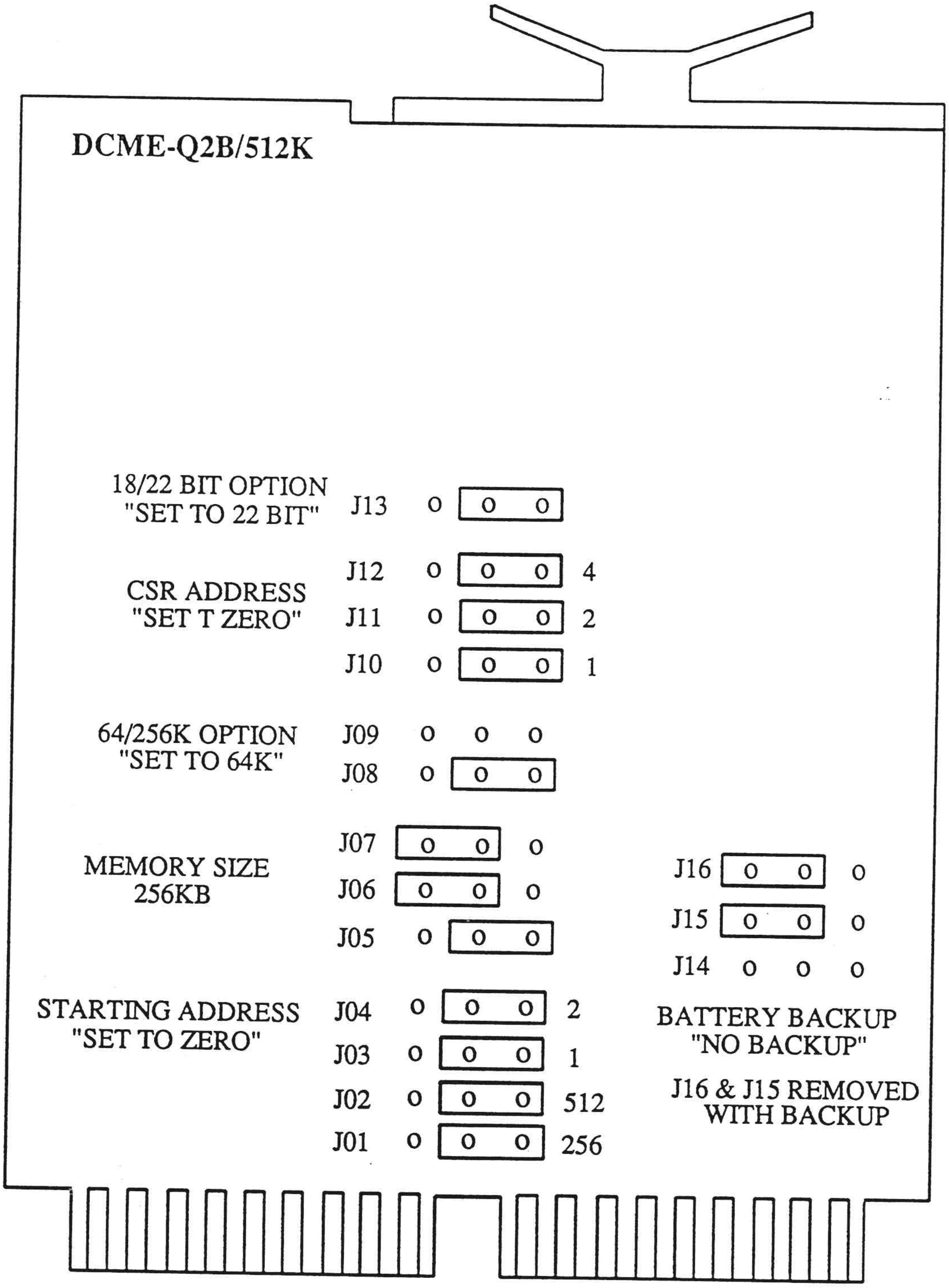
DCME-Q2A/256

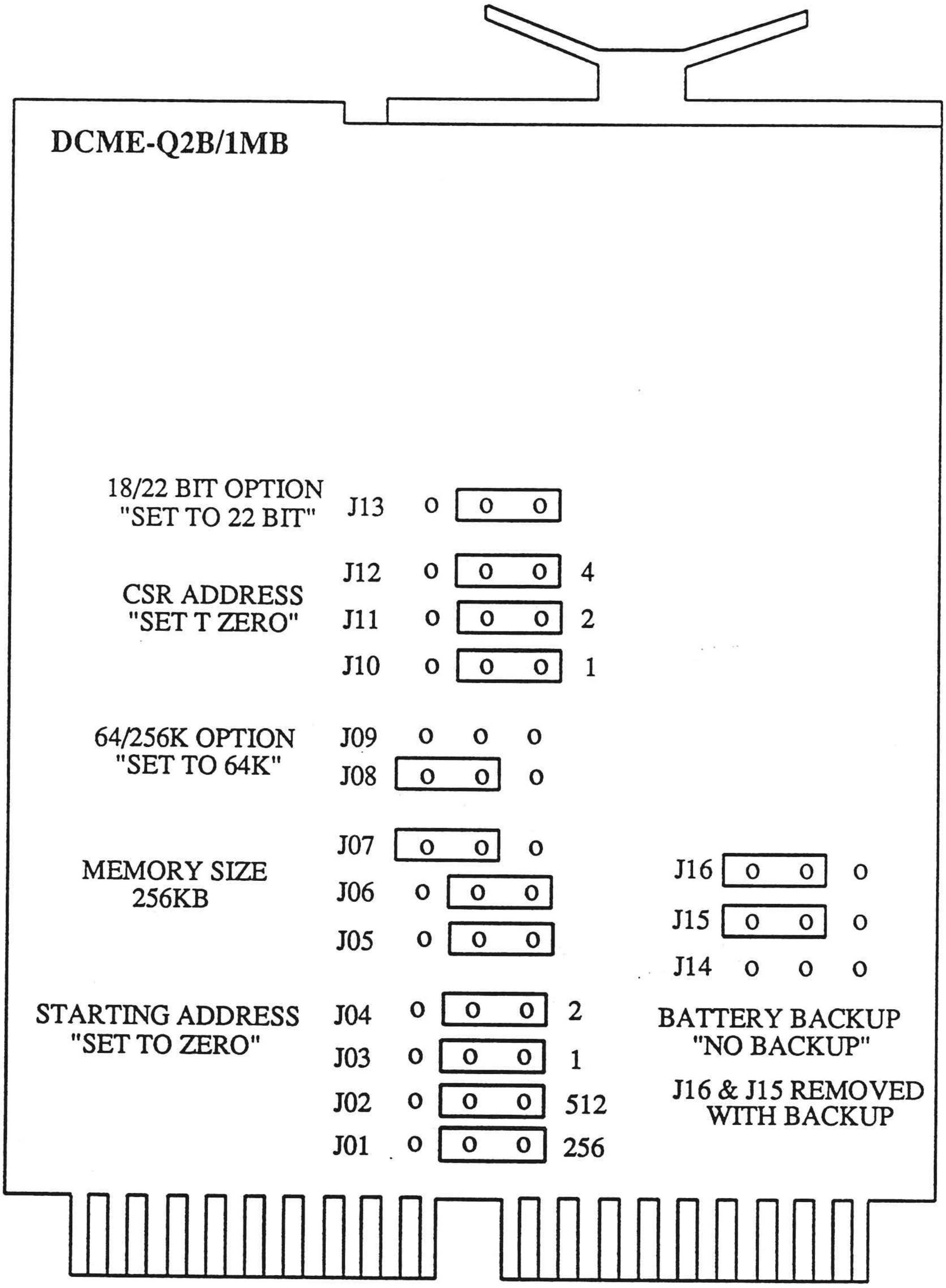

P17
P16
P15
P14
P15 & P14
MEMORY SIZING
P17 CSR BIT 14 JUMPER
RIGHT-ENABLED
LEFT-DISABLED
P16 2K I/O PAGE JUMPER
RIGHT 4K I/O
LEFT 2K I/O
P12 & P13 RIGHT WITH BACKUP
P13
P12
P11
BATTERY BACKUP
"NO BACKUP"
P05
P06
P07
CSR ADDRESS
"SET TO ZERO"
P06 1
P05 2
P04 512
P03 256
P02 128
P01 64
P00 32
STARTING ADDRESS
"SET TO ZERO"
18/22 BIT ADDRESS
P10
RIGHT-22 BIT
LEFT-18 BIT

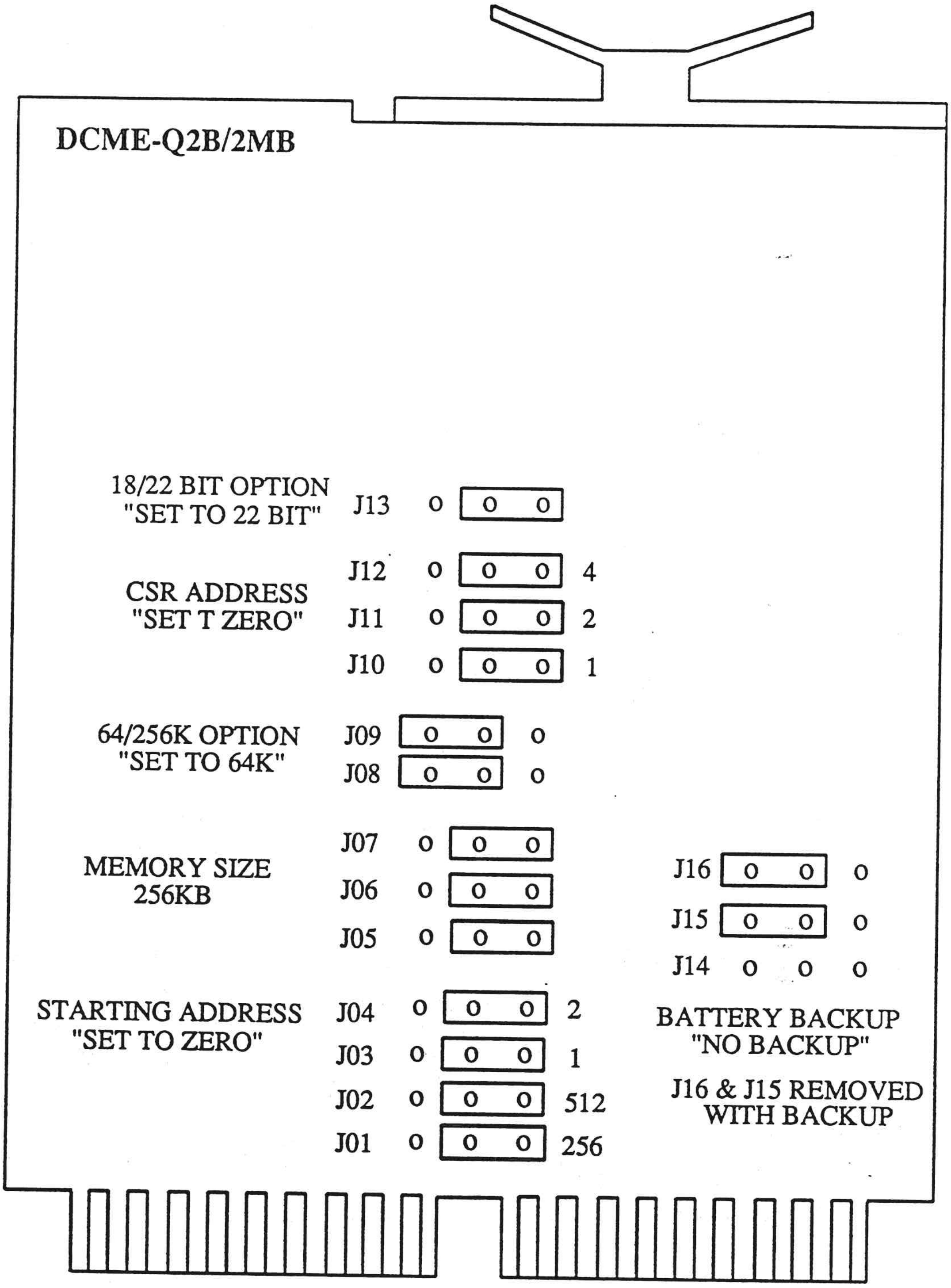
DCME-Q2A/512


P17
P16
P15
P14
P15 & P14
MEMORY SIZING
P17 CSR BIT 14 JUMPER
RIGHT-ENABLED
LEFT-DISABLED
P16 2K I/O PAGE JUMPER
RIGHT 4K I/O
LEFT 2K I/O
P12 & P13 RIGHT WITH BACKUP
P13
P12
P11
BATTERY BACKUP
"NO BACKUP"
P05
P06
P07
CSR ADDRESS
"SET TO ZERO"
P06 1
P05 2
P04 512
P03 256
P02 128
P01 64
P00 32
STARTING ADDRESS
"SET TO ZERO"
18/22 BIT ADDRESS
P10
RIGHT-22 BIT
LEFT-18 BIT


DCME-Q2B/256K
18/22 BIT OPTION
"SET TO 22 BIT"
J13
CSR ADDRESS
"SET T ZERO"
J12
4
J11
2
J10
1
64/256K OPTION
"SET TO 64K"
J09
J08
MEMORY SIZE
256KB
J07
J06
J05
J16
J15
J14
STARTING ADDRESS
"SET TO ZERO"
J04
2
J03
1
J02
512
J01
256
BATTERY BACKUP
"NO BACKUP"
J16 & J15 REMOVED
WITH BACKUP


DCME-Q2B/512K
18/22 BIT OPTION
"SET TO 22 BIT"
J13
CSR ADDRESS
"SET T ZERO"
J12
4
J11
2
J10
1
64/256K OPTION
"SET TO 64K"
J09
J08
MEMORY SIZE
256KB
J07
J06
J05
STARTING ADDRESS
"SET TO ZERO"
J04
2
J03
1
J02
512
J01
256
J16
J15
J14
BATTERY BACKUP
"NO BACKUP"
J16 & J15 REMOVED
WITH BACKUP


DCME-Q2B/1MB
18/22 BIT OPTION
"SET TO 22 BIT"
J13
CSR ADDRESS
"SET T ZERO"
J12
4
J11
2
J10
1
64/256K OPTION
"SET TO 64K"
J09
J08
MEMORY SIZE
256KB
J07
J06
J05
STARTING ADDRESS
"SET TO ZERO"
J04
2
J03
1
J02
512
J01
256
J16
J15
J14
BATTERY BACKUP
"NO BACKUP"
J16 & J15 REMOVED
WITH BACKUP


DCME-Q2B/2MB
18/22 BIT OPTION
"SET TO 22 BIT"
J13
CSR ADDRESS
"SET T ZERO"
J12
4
J11
2
J10
1
64/256K OPTION
"SET TO 64K"
J09
J08
MEMORY SIZE
256KB
J07
J06
J05
J16
J15
J14
STARTING ADDRESS
"SET TO ZERO"
J04
2
J03
1
J02
512
J01
256
BATTERY BACKUP
"NO BACKUP"
J16 & J15 REMOVED
WITH BACKUP

DCME-Q4B: QRAM-88B February 9, 1990
QRAM-22B (64Kb chips)
Diana Bechard(PSE), Lou Bezdek(Design), Robert Clancy(Tech)

BOARD DESC: Quad height DEC. Support block mope transfers.

VERSION:	TECHNOLOGY:	MFR EQUIV:
/512KB*	64Kb DIPs, half pop	
/1MB*	64Kb DIPs, full pop	MSV11-QA/FN
/1MB	256Kb DIPs, 1/4 pop	
/2MB	256Kb DIPs, half pop	MSV11-QB/FN
/4MB	256Kb DIPs, full pop	MSV11-QC/FN
/3.5MB	256Kb DIPs, full pop	

* 512K and 1MB versions using 64Kb DRAMS are obsolete

Q4A models - do not support block mode transfers. The non-block mode is provided by a special ECO.

DEC EQUIVALENTS: MSV11-DC(16K), -DD(64K), -DE(64K), -LK(256K), -MA(512K), -MB(1M), -SA(2M)

PROCESSORS: 11/03, 11/23, 11/53, 11/53+, and 11/73. Also 11/73+, 11/83, and uVAX I.

MAX MEM CAP: 4MB. Bank select option (provided by special ECO) can provide access for up to 32MB

CPU ON-BOARD MEM: only on 11/53 (512KB)

SLOT DEPENDENCY: recommend installation as close as possible to CPU, but should work in any slot

TERMINATOR: none

ERROR CHECKING: parity (parity error LED visible near edge of board)

JUMPERS:
J00-04 - starting address - 128KB increments
J05-06 - board size
J07 - 18/22 bit select
J08 - I/O page
J09-J11 - battery backup - not normally implemented
J12-14 - CSR address - must be unique for every memory board
J15-18 -bank select - all jumpers OFF except w/ special ECO

◦ BOARD LAYOUT and JUMPER SETTINGS

DIAGNOSTICS:
MAINDEC-11 CVMSA (for systems using 22 bit addressing)
MAINDEC-11 CZKMA (for systems using 18 bit addressing)
Memory Verification:
Red LED for parity errors

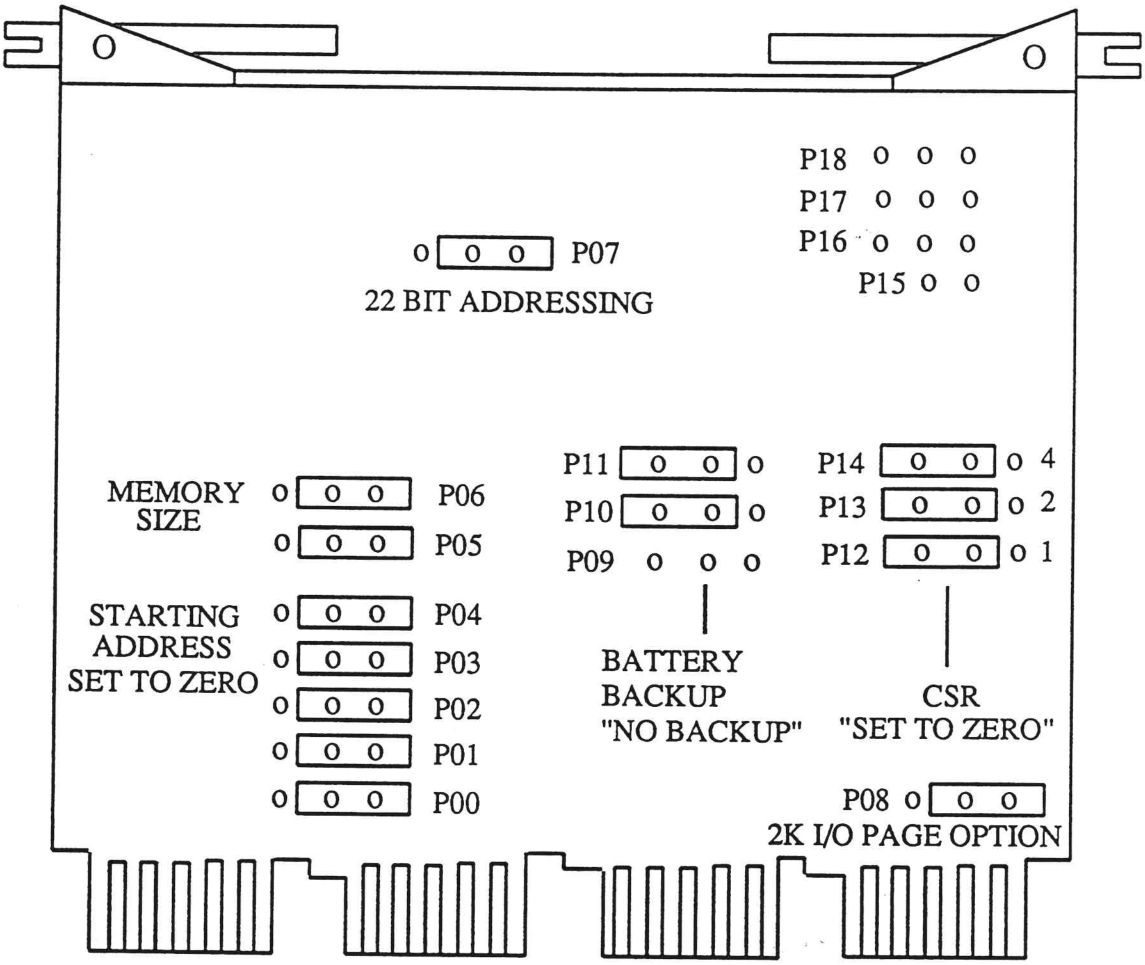
TROUBLESHOOTING:
Simple Debugging Options:

1) Check the parity LED (it will be on if any memory errors have been detected).
2) If high order memory is suspected, use the size jumpers to disable that memory for testing purposes.

CONFIGURATION NOTES:

- If the processor is an 11/53, the board must be a 4/3.5MB or smaller.
- To disable parity, remove CSR jumpers

DCME-Q4B/1MB



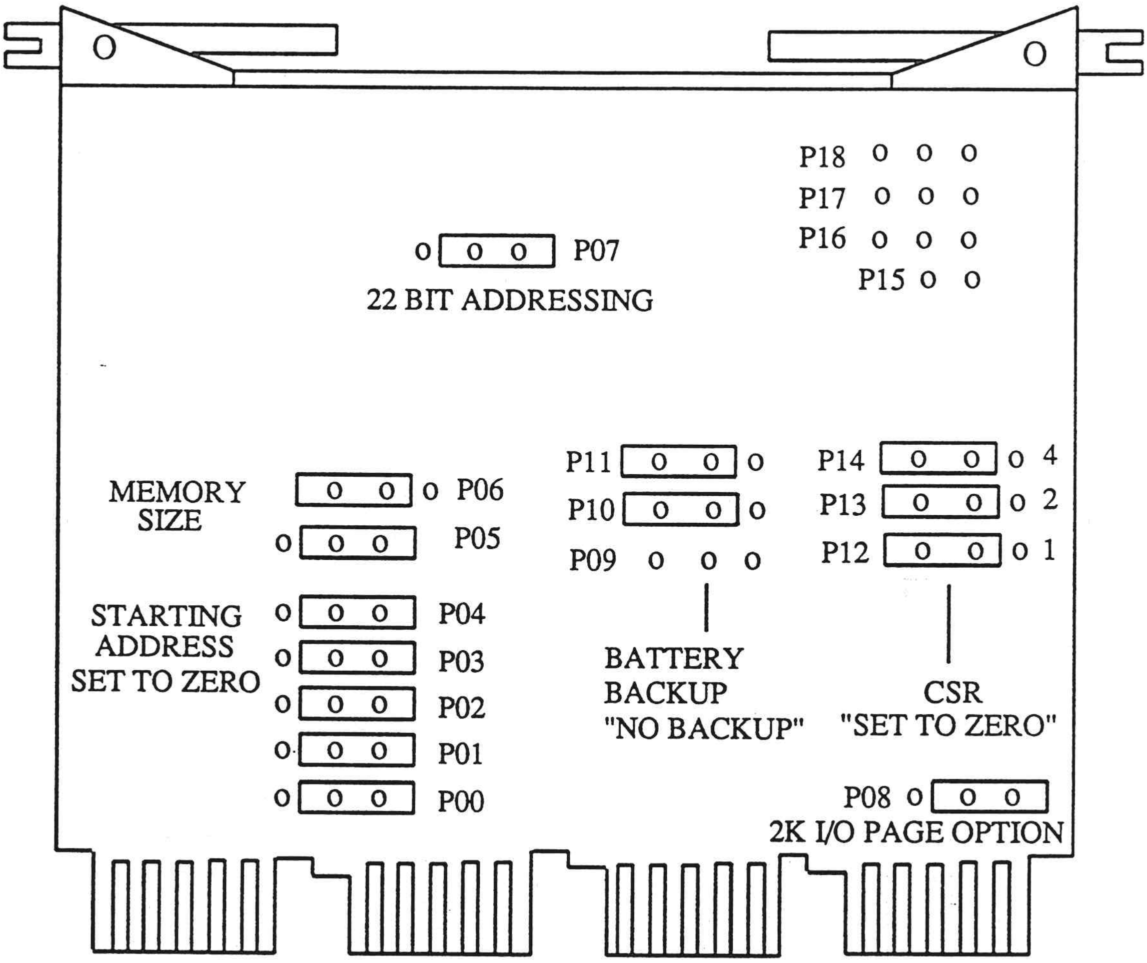
P11-LEFT
P10-RIGHT —— WITH BATTERY BACKUP

P06-RIGHT
P05-RIGHT —— 1MB

P07 —— RIGHT 22 BIT ADDRESS

P08-RIGHT NORMAL 4K I/O PAGE
P08-LEFT 2K I/O PAGE

DCME-Q4B/2MB



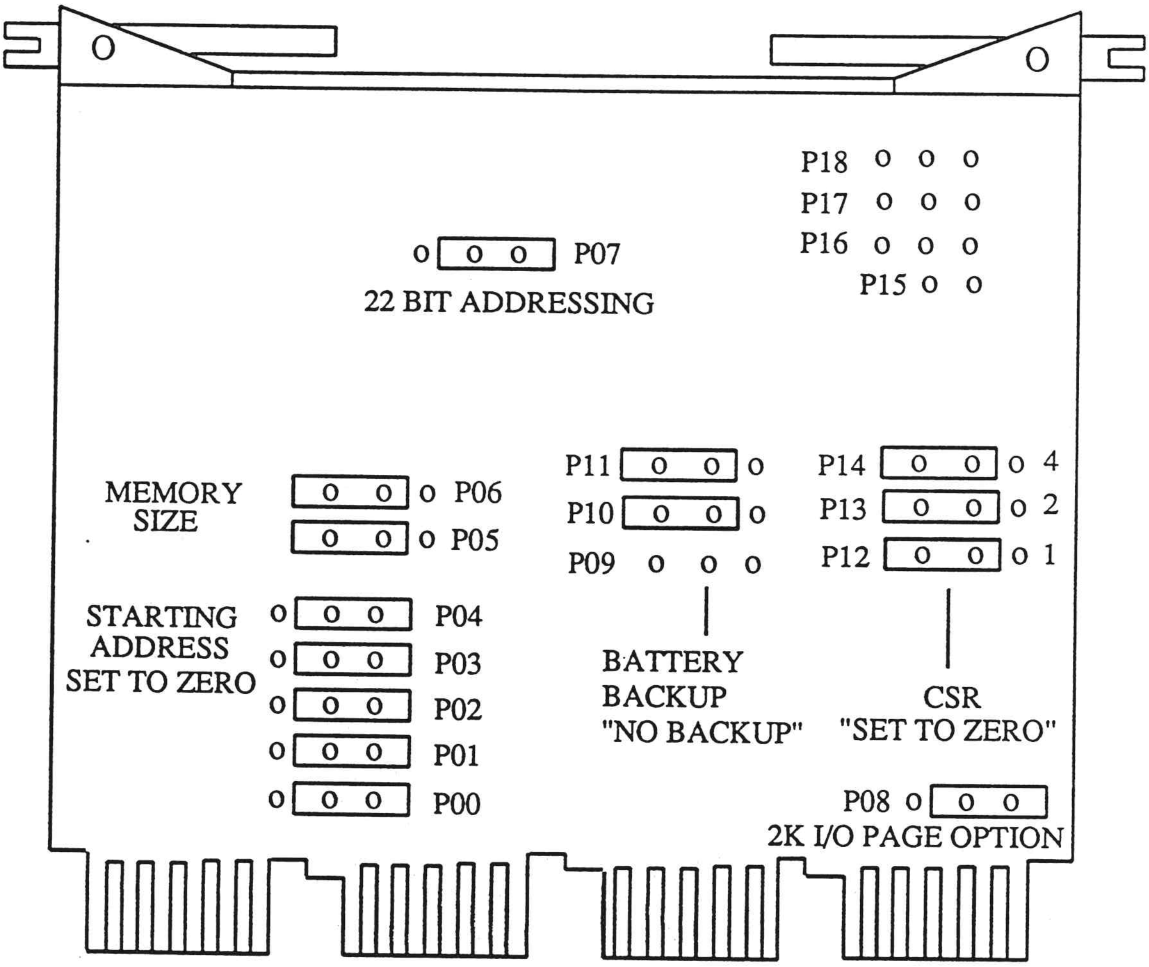
P11-LEFT
P10-RIGHT —— WITH BATTERY BACKUP

P06-LEFT
P05-RIGHT —— 2MB

P07 —— RIGHT 22 BIT ADDRESS

P08-RIGHT NORMAL 4K I/O PAGE
P08-LEFT 2K I/O PAGE

DCME-Q4B/4MB



P11-LEFT
P10-RIGHT — WITH BATTERY BACKUP

P06-LEFT
P05-LEFT — 4MB

P07 — RIGHT 22 BIT ADDRESS

P08-RIGHT NORMAL 4K I/O PAGE
P08-LEFT 2K I/O PAGE

4.[illegible]

DCME-Q4E: QED October 16, 1989
Diana Bechard(PSE), Lou Bezdek/Scott McAuliffe(Design), Bob Bridges(Tech)

WARNING: Only install the PMI jumpers on boards going into special PMI memory slots. Installing a board with these jumpers in place into any other slot WILL DAMAGE the board.

BOARD SIZE: DEC quad

VERSION:	TECHNOLOGY:	DEC EQUIV(see below):
/1MB	64KB 150ns DIPs	MSV11-JD (Q/CD only)
/2MB	256Kb 150ns DIPs	MSV11-JE (Q/CD only)
/4MB	256Kb 150ns DIPs	
/16MB	1Mb 150ns ZIPs	

/4MB-F	Measurex version - for FPJ11 coprocessor
/4MB-N	Novatel version - permits starting addr of 64 or 128KB
/4MB-W	Westinghouse version- removes the QCD enhancements

DEC EQUIVALENT:
Q-Bus: MSV11-DC(16K), -DD(64K), -DE(64K), -LK(256K), -MA(512K), -MB(1M), -SA(2M)
PMI: MSV11-JD/FN(1MB), MSV11-JE/FN(2MB)

TROUBLESHOOTING:

Common Failures:

1) Board is not seen by system - check to see that jumper P10 is out (not installed). If P10 is installed it implies that it is going to be paged memory (removing it disables bank select and windows).

2) The board doesn't work on a PMI system - check to see that the PMI jumpers are all installed.

Simple Debugging Options:

1) In machines with the PMI bus, switch between PMI mode and Q-Bus mode.

2) If you have a 4MB board, it can be jumpered down to 2MB (move P00 from left to right) to help isolate where the problem is.

Known Bugs:

- In the manual on p17, where it says PDP 1184 (after 'PDP 11/84'), it should say 'PDP 11/83'.

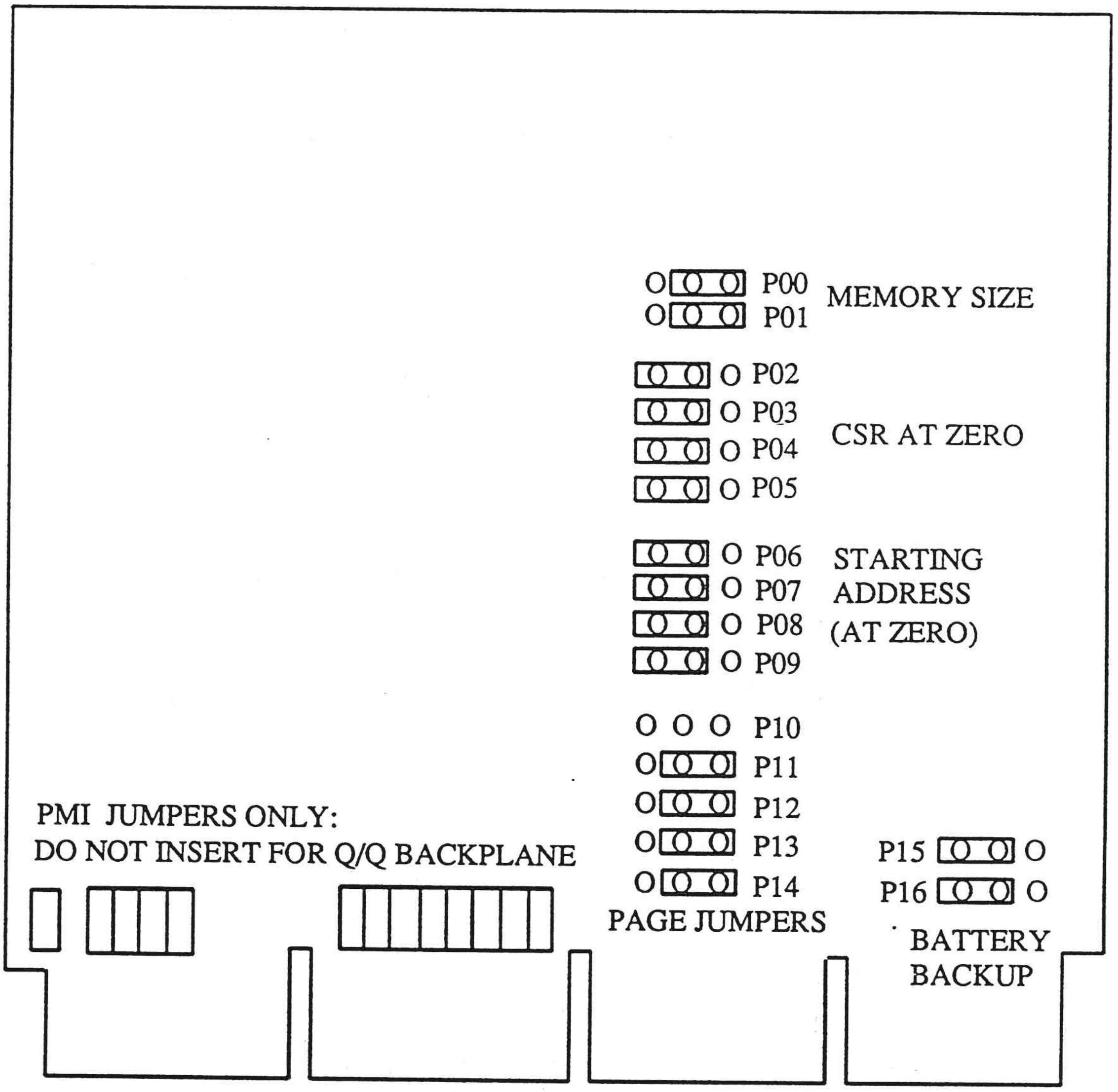
- Possible timing problems with Dilog DQ136 and DQ132 controller cards, causing files to be unreadable.

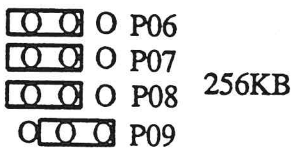
CONFIGURATION NOTES:

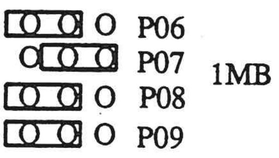
1) On PMI systems using Q4E in PMI mode, board must reside in proper memory slot.

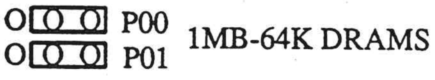
2) In Q-bus systems, bus grant continuity must be maintained. All logically contiguous slots must be filled, either with a regular Q-bus board or a grant continuity module. Some literature suggests that Q-Bus memories be installed in slots directly adjacent to the CPU. Although this may work around certain problems, it should not be necessary in properly functioning systems.

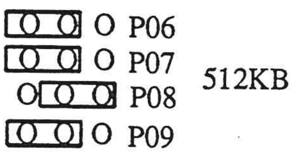
DCME-Q4E/1MB

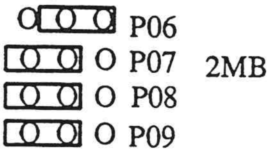

P00
P01
MEMORY SIZE
P02
P03
P04
P05
CSR AT ZERO
P06
P07
P08
P09
STARTING ADDRESS (AT ZERO)
P10
P11
P12
P13
P14
PAGE JUMPERS
P15
P16
BATTERY BACKUP
PMI JUMPERS ONLY:
DO NOT INSERT FOR Q/Q BACKPLANE


P06
P07
P08
P09
256KB

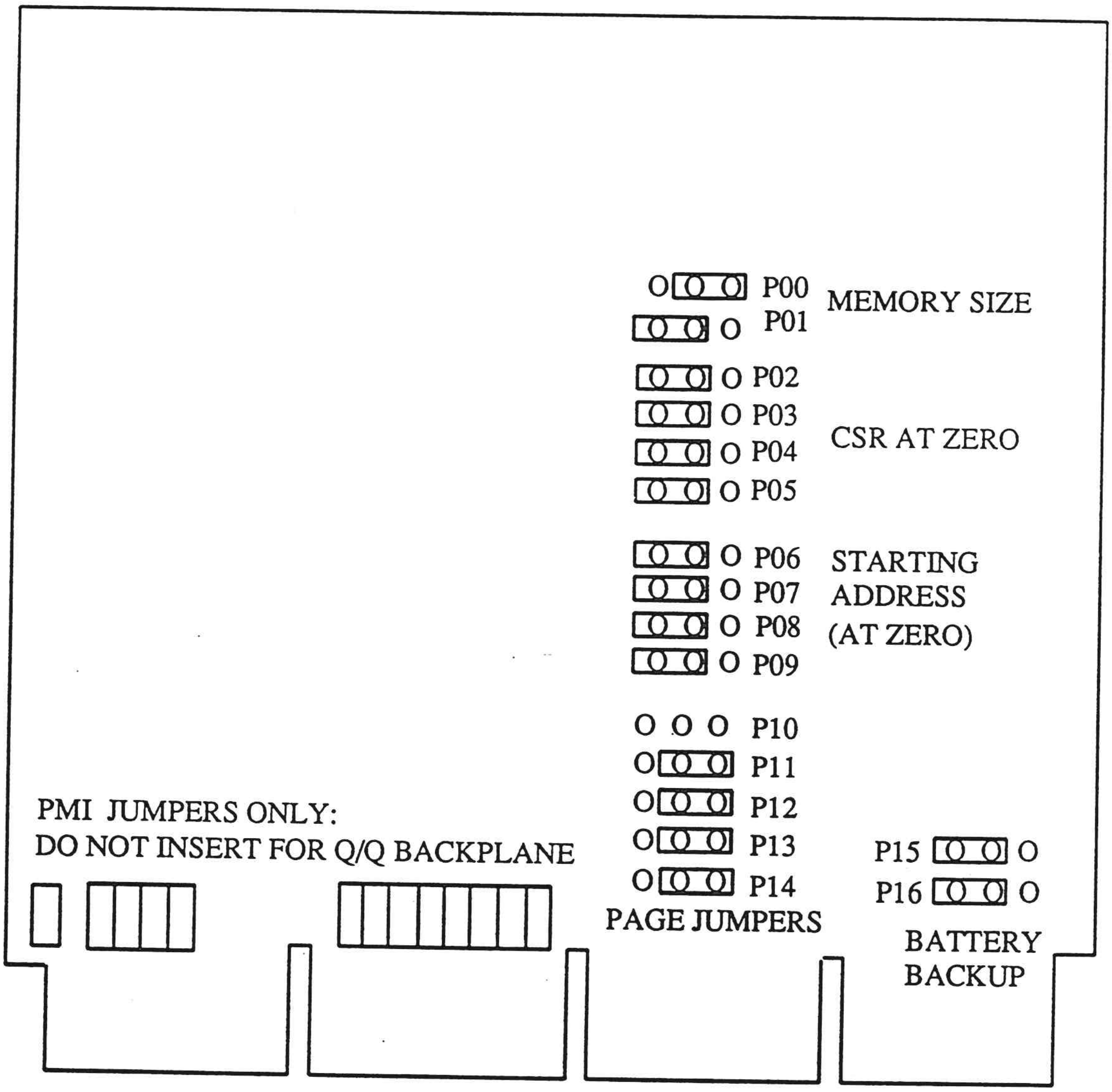

P06
P07
P08
P09
1MB

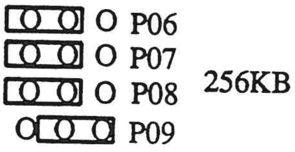

P00
P01
1MB-64K DRAMS

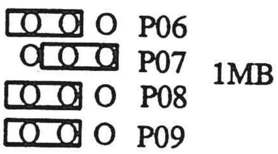

P06
P07
P08
P09
512KB

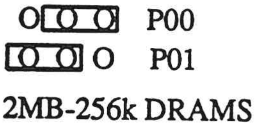

P06
P07
P08
P09
2MB

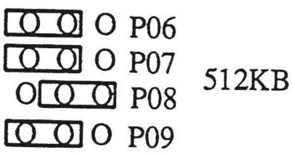
DCME-Q4E/2MB

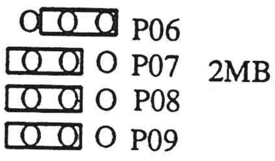

P00
P01
MEMORY SIZE
P02
P03
P04
P05
CSR AT ZERO
P06
P07
P08
P09
STARTING
ADDRESS
(AT ZERO)
P10
P11
P12
P13
P14
PAGE JUMPERS
PMI JUMPERS ONLY:
DO NOT INSERT FOR Q/Q BACKPLANE
P15
P16
BATTERY
BACKUP


P06
P07
P08
P09
256KB

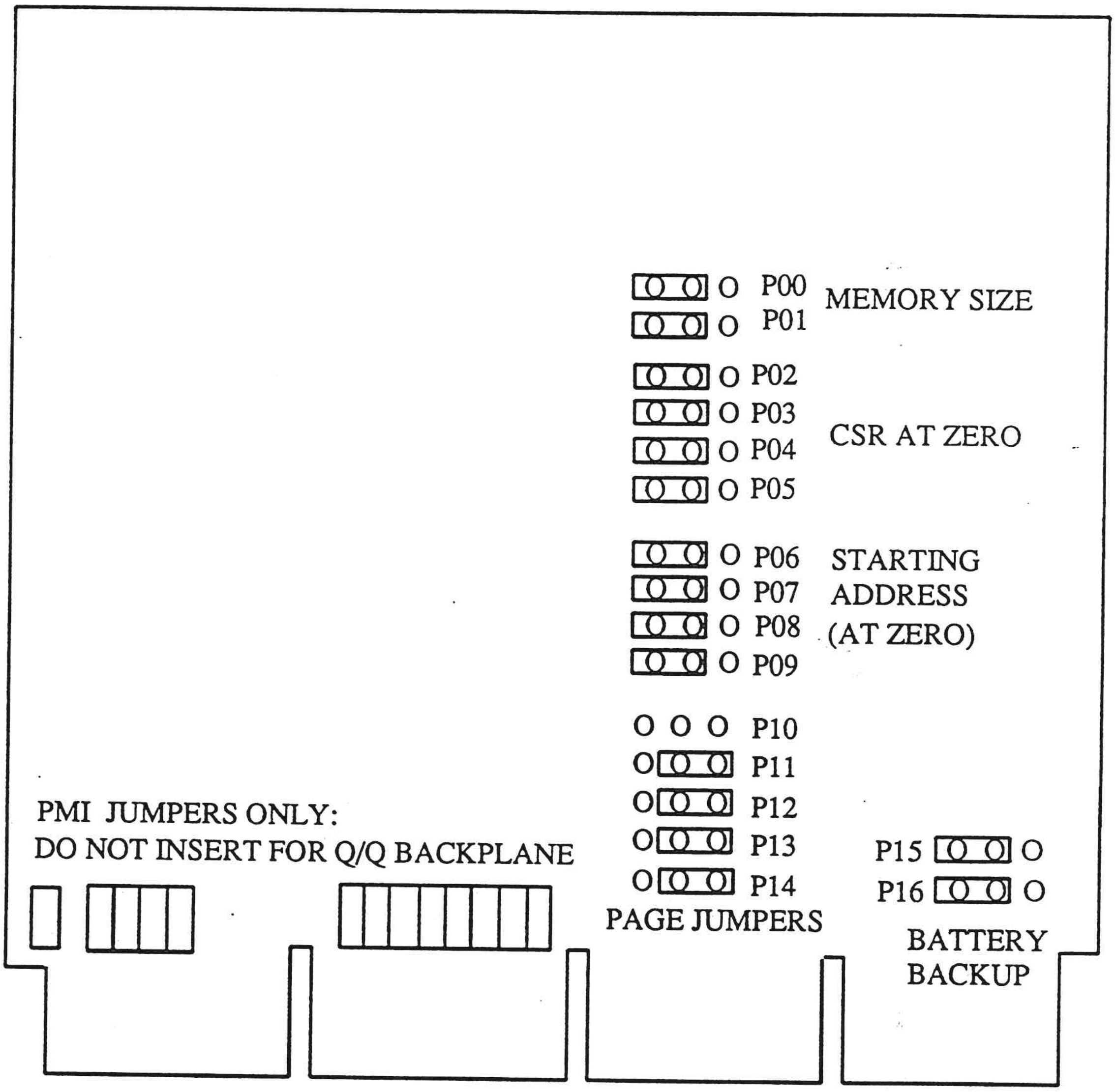

P06
P07
P08
P09
1MB

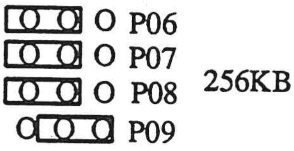

P00
P01
2MB-256k DRAMS

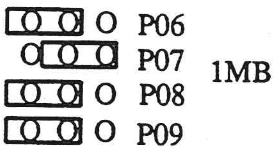

P06
P07
P08
P09
512KB

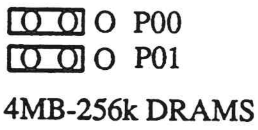

P06
P07
P08
P09
2MB

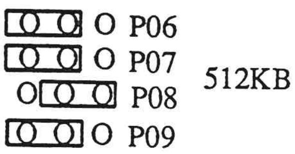
DCME-Q4E/4MB

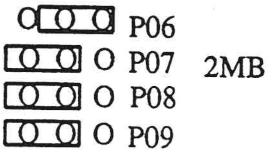

P00
P01
MEMORY SIZE
P02
P03
P04
P05
CSR AT ZERO
P06
P07
P08
P09
STARTING ADDRESS (AT ZERO)
P10
P11
P12
P13
P14
PAGE JUMPERS
P15
P16
BATTERY BACKUP
PMI JUMPERS ONLY:
DO NOT INSERT FOR Q/Q BACKPLANE


P06
P07
P08
P09
256KB


P06
P07
P08
P09
1MB


P00
P01
4MB-256k DRAMS


P06
P07
P08
P09
512KB


P06
P07
P08
P09
2MB

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	BUSSES:
11/03			only Q-Bus
11/23			
11/53			
11/53+			
11/73			
uVAX I			
VAXsta I			
11/73+	1 or 2		Q-Bus and PMI
11/83	1 or 2		
11/84	2		

CPU ON-BOARD MEM: only on 11/53 (512KB)

MAX MEM CAP: 4MB directly addressable; 64 MB max (4 MB direct, 60 MB via window)

SLOT DEPENDENCY: Q-Bus - nominally no dependency, although it is often preferable to have the memory close to the CPU.
PMI - Memory MUST go into PMI slots (NOTE: even on PMI systems, memory can go into Q-Bus slots if the memory is jumpered correctly (the PMI jumpers are pulled out). (See warning above).

TERMINATOR: none

ERROR CHECKING: EDC

JUMPERS:
PMI option - pull 26 jumpers for Q Bus mode. See warning!!
P00-01 - board sizing: 1, 2 or 4MB
P02-05 - CSR address: different address for each mem board
P06-09 - starting address: 0 - 3.75MB in 256KB increments
P10-14 - window size/location/bank select: see section 2.8
P15-16 - battery backup: see section 2.9
P17 - not used. Normally left unjumpered

◦ BOARD LAYOUT and JUMPER SETTINGS

DIAGNOSTICS:
LEDs:
green: system initialized
yellow: data error
red: multi-bit error

After initialization (approx 2 sec), the green LED should stay on.

System Diagnostics:
MAINDEC-11 CVMSA (22 bit systems)
MAINDEC-11 CZKMA (18 bit systems)

Memory parity tests: VMSAA0 and ZMSP0

Memory Verification:
To check which mode the memory is running in, enter 'M <return>' after running the 9 step memory test (the countdown you see after power up).

DCME-UNI: UNIRAM March 7, 1990

Diana Bechard(PSE), Lou Bezdek(Design), Mike Fahey(Tech)

BOARD DESC: UNIbus (hex height)

VERSION:	TECHNOLOGY:	MFR EQUIV(see below):
/1MB*	64Kb DIPs	MS11-PB (M8743-B)

* It is possible to set this board up for smaller memory capacities.

DEC EQUIVALENT:
256KB: MS11-MB (M8722-BA), 512KB: MS11-L (M8743-Ax)

PROCESSORS: 11/04, 11/24, 11/34, 11/40, 11/44, 11/45, 11/50, 11/55, 11/60

	SLOTS:		
BACKPLANES:	TOT:	MEM:	SLOT DEPENDENCY:
DD11-C	4	2	
DD11-P (K) (F)	9	4	
DD11-D	15	4	

MF11-U, MF11-L (P), ME11-L , DD11-B require some modifications

TERMINATOR: none

ERROR CHECKING: parity

JUMPERS:
SW1 - 1-5: starting address - 32KB increments
SW1 - 6-8, SW2 - 5,6: ending address - 32KB increments
SW2 - 1-4: CSR address
SW2 - 8, SW3 - 6-7: I/O page - set I/O page size
SW3 - 1: extended addressing mode ('on' for 22 bit addressing)
SW3 - 2-5: memory bank assignment

		Board 1		Board 2		Board 3		Board 4	
	SW1*	SW2	SW3	SW2	SW3	SW2	SW3	SW2	SW3
1	off	on	on	on	on	on	on	on	on
2	off	on	on	on	off	on	off	on	off
3	off	on	off	on	on	off	off	off	off
4	off	on	off	off	off	on	on	off	off
5	off	on	off	on	off	on	off	on	on
6	on	on	on	on	on	on	on	on	off
7	on	off	off	off	off	off	off	off	on
8	on	off	off	off	off	off	off	on	off

* for installations involving only 1MB boards, all starting address switches are off and ending address switches are on.

DIAGNOSTICS:

NOTE: Clearpoint boards fail DEC diagnostics

The diagnostics fail the CSR test. The CSR on DEC boards when initially powered-up are cleared. DEC does this by using a power-on reset state pal that is programmed to zero. If the CSR is not set to zero, the board will fail the diagnostics. Clearpoint does not use the power-on state pal because it is not necessary to clear the registers on power-up. Although the memory card will fail the diagnostics, it will run in normal mode fine.

Memory Verification:

TROUBLESHOOTING:

Common Failures:

1) 4th board must be reduced memory capacity

INSTALLATION NOTES:

UNIRAMs support either 22 or 18 bit addressing depending upon the switch settings used. The PAX (Physical Address Extension) bus is a slot in the UNIRAM backplane that supports 22 bit addressing. If the board is installed into any other slot, it will access only 256Kbytes using 18 bit addressing.

DCME-V75: VXR750 March 7, 1990
Chris Martel(PSE), Lou Bezdek(Design), Joan Tognacci(Tech)

BOARD DESC: Hex height

CAPACITY: /1MB
/256KB (IN PDP 11/70) = PDP-11/70

TECHNOLOGY:

MFGR EQUIV: MS750-HB - 8MB (only for 11/750); MS750-CA, MS730-CA - 1MB; MS728 - 256KB

	SLOTS:		
PROCESSOR:	MEM:	OTHER:	MAX MEM CAP:
11/750	8	20	8MB (14MB with VMS 4.4 or higher)
11/730	5	12	5MB
11/725	3	11	3MB
11/70	16	26	4MB

CPU ON-BOARD MEM: none

SLOT DEPENDENCY: see configuration notes below

TERMINATOR: none

ERROR CHECKING: EDC (parity in 11/70)

JUMPERS: no changes required

DIAGNOSTICS:
11/750 - ESCAA - diagnostic supervisor
- ECKAM - memory diagnostic
- UETP (from VMS)
11/730,725 - CRD (for short tests)
- MICMON (for more extensive test)
- ENKCC memory diagnostic
11/70 - DEKBH

TROUBLESHOOTING:
Common Failures:
1) The memory is not interleaved correctly (run the diagnostics to verify - see figure 1 on page 9 of the DCME-V7x manual).

Known Bugs:
1) DOCUMENTATION: PDP 11/70 backplane - has 8 sets of memory slots (16 total) not 4 sets as indicated in the manual

CONFIGURATION NOTES:
VAX 11/750 - 1MB boards must be closest to the memory controller (L0016 in slot 10), followed by 256KB boards.
VAX 11/730,725 - memory must be contiguous, starting in slot 6
PDP 11/70 - memory is installed in the MK11 cabinet
- the V75 requires a special ECO for use in 11/70's
- memory is interleaved (board must be installed in sets).

DCME-V78: VXR781, VXR780 October 16, 1989
Chris Martel(PSE), Lou Bezdek(Design), Joan Tognacci(Tech)

BOARD DESC: modified DEC Hex

VERSION:	TECHNOLOGY:	DEC EQUIV:
/1MB	64Kb DIPs	MS780-FB
/2MB	64Kb DIPs	MS780-FA (2 -FB's)
/4MB	256Kb DIPs	MS780-JB
/8MB	256Kb DIPs	MS780-JA (2 -JB's)

DCME-V78/BAFFLE

PROCESSORS: VAX 11/780, 11/785

MAX MEM CAP: 64MB

MEMORY SLOTS: 16

SLOT DEPENDENCY:

BACKPLANES: MS780E only

ERROR CHECKING: EDC

JUMPERS: should never be changed

DIAGNOSTICS: DEC Microdiagnostic No. 3 (ESKAR) (load diskette, power cycle the DC power switch of the LSI/11 maintenance CPU, and after it reboots, enter 'T'<CR>.
NOTE: ESKAR V.0 does not work with 4 and 8MB boards.
Memory Verification:

TROUBLESHOOTING:
Common Failures:
1) Check whether all 2 or 8MB board/filler pairs on modula board boundaries (slots 1 and 2, 5 and 6, etc; NOT 2 and 3).

2) The memory is not correctly interleaved (see configuration notes below).

CONFIGURATION NOTES:
1) V78s are only compatible with MS780-E version backplane (the 11/780E series memory controller). They are specifically NOT compatible with MS780-C backplanes.
- NOTE: The logic must be at least up to Rev E.

2) Memory boards populated with 64Kb DRAMs are not compatible with boards populated with 256Kb DRAMs

3) V78s are compatible with the M8375 memory controller and the M8376 SBI interface.

4) 2MB and 8MB cards must be accompanied in an adjacent slot by filler cards (they will be recognized by the system as 1/8MB cards respectively).

5) When the system has interleaved memory (when there are memory controllers in both slots 10 and 12), memory must be added symmetrically to both sides. When there is only one controller, memory must be added to the side with the controller.

6) Additional memory should be contiguous to existing memory

DCME-V82: February 13, 1990
Chris Martel(PSE), Bill Kopsoftis(Design), Luis Martinez(Tech)

BOARD DESC: BI Bus, zero insertion force connectors

VERSION:	TECHNOLOGY:	MFR EQUIV:
VBIA/8MB	256Kb ZIPs	MS820-BA (4MB)
VBIA/16MB	1Mb DIP	MS820-CA
VBIC/2MB	256Kb ZIP	MS820-AA (2MB)

also: VBITH2
VBITH3
VBITH4
VBITH5
VBITOOL extractor tool

PROCESSOR:	SLOTS:	MAX MEM CAP:
8200/1	12	96 MB
8200/2	24	128 MB
8250		
8300/1	12	96 MB
8300/2	24	128 MB
8350		

CPU ON-BOARD MEM: none

SLOT DEPENDENCY: no physical requirement. Must have highest node address.

BACKPLANES: 12 and 24 slotTERMINATOR: none

ERROR CHECKING: EDC

JUMPERS: none

DIAGNOSTICS:
DEC: Clearpoint boards fail DEC diagnostics (for example, EDKAX). Diagnostics are looking for only 2MB, so when it sees >2MB (when it tries to write to illegal locations and the read SUCCEEDS), it generates an error.

Clearpoint: Insert floppy disk or TK50 cartridge into drive. Run diagnostics by booting diagnostic medium (for floppy, 'b csa1').

FROM VMS:

```
 SHOW ERROR    :to get error log summary
 ANALYSE/ERROR/INCLUDE=MEMORY/SINCE=01-JUL-1989   :to get
detailed listing
```

Memory Verification:

```
 SHOW MEM
```

TROUBLESHOOTING:

Simple Debugging Options:

1) Check to make sure you have the correct top hats (3 top hats (C, D, and E) each with 2, 3, 4, or 5 connectors) and that they are installed correctly.

2) If the board is not being recognized by the system, make sure tht there is a node plug in place for that slot.

3) If the board is not being seen, or if it is not working correctly, try cleaning the slot.

Fails the latest Clearpoint diagnostics version 2.5 with the following message:
"Testing BI Node A: - SB EDC   Machine Check Exception!"
A bad crystal at location x-1 on the VBIC causes this error message.

INSTALLATION NOTES:

When the board is initializing correctly the green LED comes on several seconds after power up and the yellow (single bit) and red (double bit error) stay off.

NOTE:

VBIC (controller) should be installed furthest from the CPU
VBIA's (array cards) are installed to the right of the VBIC

DCME-V86: VXR8600 January 2, 1990
Chris Martel(PSE), Lou Bezdek(Design), Paul Lola(Tech)

BOARD DESC: modified hex

VERSION:	TECHNOLOGY:	MFR EQUIV:
/4MB	256Kb DIPs	MS86-AA/FN
/16MB	1Mb DIPs	MS86-CA/FN

DEC also offers a 64MB board (MS86-DA)

	SLOTS:				
PROCESSOR:	MEM:	I/O:	CPU:	ABUS:	MAX MEM CAP:
8600	8	20	18	5	128MB or 260MB with VMS Rev 4.7 or Higher
8650 (faster cpu)					

CPU ON-BOARD MEMORY: none

SLOT DEPENDENCY: slots must be filled right to left

TERMINATOR: terminator board in slot 9:
Also, load boards

ERROR CHECKING: EDC

JUMPERS: none

DIAGNOSTICS:

EDK5A: from the console

```
>>> diag

show clock            check current clock speed and clock
speed options
run/pass:1 edk5a      load and start diags
set clock x1          set clock slow
sho clock
start/pass:1          run diags
set clock x6          set clock fast
start/pass:1          run diags
set clock x4          set to standard speed
sho clock
reboot
b                     if necessary
```

In VMS:

```
Show Mem
show mem/phys
show error
anal/err/include-memory/since=16-oct-1989
Anal/error/since=dd-mmm-yyyy/include=mem (i.e. 19-oct-1989)
```

Memory Verification: automatic on power up

Also, SHOW MEM in VMS

DCME-V88:   VXR8800   June 18, 1990
Chris Martel(PSE), Lou Bezdek(Design), Paul Lola(Tech)

BOARD DESC: Mother board with 4 daughter cards.

VERSION:	TECHNOLOGY:	MFR EQUIV:
/16MB	256Kb SOJs	MS88-CA/FN
/32MB	1Mb SOJs	MS88-HA/FN (2 16MB boards)
/64MB	1Mb SOJs	MS88-DA (1 brd), MS88-EA (4 brds)*

* Rev B is now obsolete. Arrange to replace problem boards from the field.

PROCESSOR:	MEM SLOTS:	MAX MEM CAP:
8500	5	320MB
8530		
8550		
8700	8	512MB
8800*		
8900		

*early 8800s had 1/2" backplane slots. Since our board is thicker, it will require two backplane slots in these systems. Also, older versions of the 8800 may lack diagnostics for 64MB boards. The Pro-350 front end should have rel 8 or later.

CPU ON-BOARD MEM: none

SLOT DEPENDENCY: Private memory bus or memory interconnect bus.

TERMINATOR: none

ERROR CHECKING: EDC

JUMPERS: none

DIAGNOSTICS:
From Pro OS (front end): (REV 5.0 AND ABOVE)

```
MIC>DIA/SE:EZKBA
MIC>DIA/SE:EZKBB
```

From VMS:

```
Show Error
Show Mem
Analyse/error_log/since=dd-mmm-yyyy/include=mem
```

(i.e. 19-oct-1989)

Memory Verification:
VMS: Show Memory
ULTRIX: memory configuration verified during start up

TROUBLESHOOTING:

CONFIGURATION NOTES:
- Larger capacity board in lower number memory slots.
- No empty slots between memory boards

INSTALLATION PROCEDURES:

Always check a system out thoroughly (run diagnostics) and check error logs BEFORE installing memory upgrades.

- shut system down

  ```
  (VMS:  @sys$system:shutdown)
  (ULTRIX: /etc/shutdown -h now)
  ```

- at console prompt:

  ```
  >>>dis a b          /*disable autoboot*/
  >>>@sysinit         /*load microcode*/
  >>>test/c           /*enter microdiags*/
  MIC>set flags sbe=0
  MIC>dia/se:ezkba
  MIC>dia/se:ezkbb
  MIC>exit
  >>>pow off
  ```

- add memory to system

  ```
  >>>pow on
  ```

- repeat diagnostics tests, and then reboot

DCMS-TSB: July 2, 1990
Chris Martel(PSE), (Design), (Tech)

SUBSYSTEM DESC:

Subsystem: 4MB/sec xfer rate. 19 inch rack.
Controller: MSCP to SCSI adapter. Inserts into BI bus.
Disk Array: between 1 and 7 Exabyte differential 8mm drives.

TSB SCSI HOST ADAPTOR FEATURES:

1) Takes only one VAXBI slot
2) Supports up to seven devices per controller
3) TMSCP (tape mass storage communicat9ion protocol) emulation
4) Operates completely independently from DEC KLESI/TU81 Plus tape subsystem.
5) High speed FIFO buffering
6) Motorola 68020 processor
7) The Clearpoint Subsystem Maintenance Utility (CSMU) for subsystem maintenance, diagnostics, and monitoring via the RS232 serial port

TSB TAPE DRIVE FEATURES:

1) Industry standard, removable 8mm helical-scan tape
2) Five tape cartidge sizes, from 256MB to 2,500 formatted storage (2.5GB)
3) On board error correction code (ECC) and error recovery procedures (ERP)
4) Differential SCSI interface
5) Dual SCSI connectors on the back panel for daisy chaining multiple devices

A

DCMS-TSB HOST ADAPTOR SPECIFICATIONS:

Emulation: TMSCP
Interface: Differential SCSI, sync or async
Microprocessor: 20 MHz Motorola 68020
Buffer: FIFO Buffering
Peak Transfer Rate (SCSI) : 4MB per second
Peak DMA Rate: 8 MB per second
Power: 5.5 amps of +5 volts
Operating Temperture: 5 degrees to 50 degrees C
Humidity: (non condensing) 10% to 95%
Physical: Standard Digital VAXBI bus

DCMS-T01 8mm TAPE DRIVE SPECIFICATIONS:

Format:
Recording Format: 8mm helical scan digital computer tape
Storage Capacity: Up to 2.5 GB per cartridge
ECC: Reed Solomon (non-recoverable error rate <1 in 10^13 bits read)
Head Configuration: Read after write with seperate full width erase head
Linear Recording Density: 43,200 bits per inch
Areal Recording Density: 35 million bits per square inch

Performance:
Peak Transfer: 1.5MB per second
Sustained Transfer 246KB per second
Buffer Size: 256KB
Electronic Buffer Access Time: 400 microseconds

Reliability:
MTBF: 30,000 hours at 10% duty cycle
MTTR: <15 minutes
Tape Motion:
Tape Speed: 0.429 ips
Effective Head to Tape Speed: 150 ips
Maximum Rewind Speed: 75 times nominal
Rotor Speed: 1800 rpm

The DCMS-TSB tape sub-system is compatible with three different VAX system architectures that utilize the VAXBI bus.-----the 82/8300 series; the 85/87/8800 series; and the 6000 series.

NUMBER OF BI SLOTS

VAX8200	12 OR 24
VAX 8300	12 OR 24
VAX 8500	6/ cardcage
VAX 8700	12/ cardcage
VAX 8800	12/ cardcage
VAX 6000	6 OR 12

Note: When installing the DCMS-TSB host adaptor at a lower BI node ID number than that of any other existing tape device, the DCMS-TSB displaces it as MUAx , moving it to MUBx, or other device name. For example, If you have an existing DEC KLESI tape adaptor controlling a TU81 tape drive, the drive device name is MUA0. If a DCMS-TSB adaptor is installed at a lower BI node ID number, the TU81 becomes MUB0 , and the tape drives on the TSB adaptor become MUA0 through MUA6. This device name change may affect existing command files for tape backup. To avoid this problem, install the DCMS-TSB at a higher node ID than other tape drives in the system. [In the VAX 6000 series, there is an exception: the TK50 tape adaptor is always installed at the highest BI node ID, and should remain there.] If no higher node ID is available, discuss your installation plan with your service representative.

IMPORTANT
The DCMS-TSB SCSI host adaptor provides terminator power for the SCSI bus. Any devices which actively provide terminator power can cause damage to the subsystem if installed on the SCSI bus. The DCMS-T01 tape drive does not provide terminator power.

After the system is booted and logged in with privileges, verify that VMS recognizes the SCSI host adapter and tape drives.

Example:

```
SYSTEM> SHOW DEVICE MU <return>
```

VMS will respond with the following:

```
Device               Device   Error   Volume   Free     Trans   Mnt
  Name               Staus    Count   Label    Blocks   Count   Cnt
VENUS$MUA0           Online    0
VENUS$MUA1           Online    0
VENUS$MUC1           Online    0
```

VENUS$MUA0 and VENUS$MUA1 are the DCMS-T01 if the customer has installed two DCMS-T01 tape drives. VENUS$MUC1 is a TK50 tape adaptor.

To test the DCMS-TSB the next procedure is to intialize the drive unit
Example:

```
SYSTEM> init mua0:test
```

This procedure will format the tape so that data can be written to it. The amber LED ("busy light") will flash during this operation.

Mount the tape:

```
SYSTEM> mount/for mua0:test
```

"By using the foreign qualifier in the mount command, this indicates that is not standard format used by VMS operating system; that is, a tape volume is not in the standard ANSI format, or disk volume is not in files-11 format."

Do a simple backup:

```
SYSTEM>backup/verify/block_size=65,024*.*;*  mua0:save.bck/label=test
```

"The new firmware revision will allow a block size of: 65,024"

During the backup procedure the amber LED will flicker on and off indicating the tape is being processed.

Unmount the tape:

```
SYSTEM> dismount mua0:
```

If you do not want the tape to eject when doing a dismount, use the **nounload qualifier.** SYSTEM> **dismount /nounload mua0:**

The Clearpoint Subsystem Maintenance Utility (CSMU) provides direct interface into the host adaptor. This enables users to monitor and troubleshoot the the TSB without taking the system down.

To monitor the TSB, the terminal should be set to the following attributes:

9600 baud
8 bits
no parity
1 stop bit
no Xon/Xoff

VMS does not have to be running in order to access the CSMU

CAUTION: Do not attempt this while the system is booting. Many of the CSMU operations will directly conflict with the system intialization during the boot process. The CSMU functions can be done when the system is shut down or after booted.

```
        Password protection disabled, superuser privledges granted.
*********   Clearpoint Subsystem Maintenance Utility   *********
 Revision 4-11-1990                   Copyright (c) Clearpoint 1989,1990

          ◦ 1  Show Units
          ◦ 2  Monitor Units
          ◦ 3  Place Unit in Service Mode
          ◦ 4  Make Unit Available for System Use
          ◦ 5  Rewind Tape
          ◦ 6  Scan Tape
          ◦ 7  Fill Tape
            C  Console Debugger
            T  Tape Debugger
          ◦ E  EEPROM Manager
          ◦ X  Exit CSMU

  Enter Choice:
```

NOTE: This is the CSMU without Fast File Search

◦ DCMS-TSB with Fast File Search

To display the status information about all the tape drives in the subsystem, select item1, Show Units, from the main menu.

```
Enter choice: 1

     Exabyte drive at ID 0 }  This Note appears if the system has not
     Exabyte drive at ID 1 }  yet booted

                    Current Unit Status

Unit       Status       Remaining Tape        Name
0          Service      2291 MB               EXABYTE
1          Service        285 MB              EXABYTE


Type any key to return to menu:
```

The unit column shows the SCSI ID of the drive

The Status column indicates whether the drive is available to VMS (service mode) or cannot be accessed by VMS (service mode). In system mode, the system can read or write to the tape. Service mode takes the tape drive off-line for debugging purposes.

Remaining tape column indicates the storage capacity from the current position of the tape on the drive heads to the end of the tape. Note that this column is not continuously updated as the tape is being used.

The name column shows the type of of tape drive at that SCSI ID.

This option allows the customer to monitor the status of drive activity. This display is updated every 6 seconds, or longer if a higher priority tape operation is occuring. If more than one drive is connected in the subsystem, the display will rotate through all the drives, in order. The drives must be in the system mode to be monitored.

```
Enter Choice: 2

 Monitor Unit Status     -      type any key to exit

 Unit        Remaining Tape     Error Rate        Last Sense
 0           2291 MB            0%
```

The Unit column shows the SCSI ID of the drive.

The remaining Tape column indicates the storage capacity from the current position of the tape on the drive heads to the end of the tape (approximately how much capacity is remaining).

The error rate column shows the percentage of 1 K blocks that required re-writing or re-reading/ECC

The Last Sense column provides the most recent status reported by the tape drive. A text message will be dispalyed. It is often blank since the majority of the work done by the drive is represented by the zero sense status, which is not displayed.
(See Manual section 5-5 for further information)

Service Mode makes the unit unavailable to VMS. If you have not booted VMS, selecting item 1 automatically puts all units into service mode.

CAUTION: Placing a unit in service mode during a backup operation will abort the procedure

```
Enter choice: 3

  Put Unit in Service Mode
  Note: This unit will be unavailable for System use.
  Enter Unit: 0
```

To make a unit available to VMS, select item 4, Make Unit Available for System Use, from main menu.

```
Enter choice: 4

Make Unit Available for System Use
Enter Unit: 0
```

To rewind tape, select item 5, Rewind Tape, from main menu. The unit must be in service mode in order to rewind

```
Enter choice: 5

  Rewind Unit
  Enter Unit for Operation: 0
  Exabyte drive at ID 0
  Do you wish to continue (y or n): Y
  Rewind completed successfully


Type any key to return to menu:
```

Simple Debugging Options:

1) Check the board for damage. Check for loose chips and bent or broken pins. Inspect the board very carefully, and press down firmly on any chips you suspect may be loose.

2) When reinserting the board, slide it all the way into the chassis and press firmly. Make sure the board is flush with the others. Also check to see that all cables are attached correctly and seated well (make sure daisy chain cable is in place - see figures 1, 2 and 3 in Section 2.3).

3) From the console prompt, run the ROM diagnostics. If this passes, boot the system and run the system diagnostics (/usr/sys/diag). Use the messages to help isolate the problem. j If the customer has the stand-alone board diagnostics (see chapter 4 in the manual).

4) Deinstall the board to check if the system boots and runs normally without it. Reinstall it carefully once again to verify that the problem is repeatable.

5) Check the starting address and memory size jumpers settings (see section 2.3.2 in the manual).

6) Check the configuration to verify that it is legal. Verify that:

- the board is in a proper memory slot (see figures 1 and 3 in Section 2.3).
- that you have a memory board in the CD connectors of slot 2 (you cannot skip a memory slot or install a non-memory board).

7) Change the logical location of the boards using the memory location jumpers on the outside of the board.

8) Swap the board with a known good board, or into a known good slot.

Known Bugs:

CONFIGURATION NOTES:

INSTALLATION PROCEDURES:

INSTALLATION NOTES:

THIRD PARTY MAINTENANCE:
DEC: Part Numbers -
FS CLP27-TA - Initial 1x1 system
FS CLP27-TB - additional exabyte units

The Scan Tape option verifies the ability of the tape drive to read the date on the tape. It offers the option to display the data while reading. If displaying data is selected, block size can be specified from 1 to 512 bytes. The scan displays 16 bytes in HEX and the ASCII equivalent (if possible) across each line. After displaying 256 bytes, it prompts for a continue or exit command. If not displaying data, block size can be specified from 1 to 32768 bytes.

If not displaying data information will be printed to the screen indicating what was found on the tape in the form of symbols:

!	80-byte block (most likely an ANSI header)
#	filemark
.	a block of requested size
~	a block smaller than the requested length

To use Scan Tape, the unit has to be in service mode.
Rewind tape in order to scan the data written to the tape using the Fill Tape Option.

The sample screen shown displays data in 512-byte blocks that were written to the tape during the Fill Tape Operation.

```
Enter choice : 6
Test Unit: Media Scan
Enter Unit for operation: 0
Exabyte drive at ID 0
Enter Block Count: 100
This operation will read data blocks until
either 2 sequential filemarks are encountered, an error is
reported, or the requested block count is reached.
Do you wish to display data (Y or N) ? [N]
Enter Block Size: 512
Do you wish to continue (y or n) : y
```

See section 5-9 of the manual if you chose Yes to display data.

The fill tape option writes a selected number of 512-byte blocks of sequential numbers to the tape. This tests the ability to write to this tape drive unit. The block size is automatically set to 512 bytes. Each [.] represents a block written. A [#] indicates the end of the file (EOF) mark.

```
Enter choice: 7

Fill Tape

Enter Unit for Operation: 0

Exabyte drive at ID 0
Enter block count: 100
....................................................................................................#

Fill Tape completed

Type any key to return to menu:
```

Rewind tape (see Step 9) in order to scan the data written to the tape by using the Fill Tape Option.

When the host VAX is powered up durinng the boot process, information is diplayed on serial port reflecting the state of the subsystem. No intervention is necessary; the DCMS-TSB will automatically display this information. On power up the following two lines should appear on the terminal connected to the CSMU:

```
ABCDEFGHIJKLMNOPQRSTUV
PS1:880 HS1:
```

This information means the DCMS-TSB host adaptor initialized succesfully. The yellow LED on the DCMS-TSB host adaptor will be lit when this information is displayed. During the boot process the VAX CPU and O/S will reset the board a few more times. These same two lines will be displayed for each reset. The number of resets depends on which BI system the DCMS-TSB is installed in.

Later on in the boot, the O/S will poll all its adaptors to see what devices aer connected to them. When the DCMS-TSB is polled, it will display information similar to the following:

```
PS1:880  HS1:a4c6  PS2:10a4 HS2:cdb8  PS3:20c6 HS3:3 PS4:405f HS4:3
Exabyte drive at ID 1
Exabyte drive at ID 0
```

This indicates what the DCMS-TSB host adaptor finds on the SCSI bus and displays the SCSI ID. In this example two Exabyte 8mm tape drives were found at SCSI ID 1 and SCSI ID 0.

PROBLEMS:

Host Adaptor LED Not On

1) The yellow LED on the host adaptor does not illuminate on power up, indicating that the DCMS-TSB host adaptor did not intialize successfully.

SOLUTION:

Bad cables or an improperly seated board can cause self test to fail. Follow the following steps until the problem is diagnosed.

1) If possible connect a terminal to the serial port and power up.
This might tell why the DCMS-TSB is failing self test.

2) Power off the system reseat the host adaptor, and power on.

3) Power off the system, reseat the internal SCSI cable, and power on.

4) Power off the system, disconnect the internal SCSI cable from the back of the BI bus, and power up. **If the LED comes on**, power off, connect the internal SCSI cable, disconnect the extrenal SCSI cable from bulkhead plate on the VAX and power up. Repeat this procedure all the way back to the SCSI terminator to locate the component that is causing the the porblem.

5) **If the LED never comes on** , try another BI slot or clean the slot. If the LED still does not respond, replace the DCMS-TSB host adaptor.

No Data Displayed on the CSMU Terminal

1) The DCMS-TSB host adaptor initializes on power up, but no information displays on the terminal connected to the serial port.

SOLUTION:

This indicates that the board may be functioning properly, but for some reason the data is not getting to the terminal. Follow the following steps until the problem is diagnosed.

1) Verify your terminal settings. A terminal set up incorrectly will inhibit data from being displayed

2) Verify that the null modem cable from the bulkhead connector to your terminal is seated correctly.

3) Reseat the internal SCSI cable. Try a spare cable if available.

Tape Drives Not Recognized by VMS

1) VMS does not see any tape devices on the DCMS-TSB host adaptor

SOLUTION:

Verify that the intialization LED is lit on the DCMS-TSB board.

If the LED is lit, this means the adaptor could not communicate with the tape drives. Follow these steps listed below until the problem is diagnosed.

1) Check that all drives are powered up. The DCMS-TSB host adaptor will not recognize any drives that are not powered up.

2) If possible, connect a terminal to the serial port. At the CSMU main menu select item 1, **Show Units**. This will tell you independently of the O/S what the host adaptor recognizes. If the CSMU sees the drives, but the O/S does not, call product support.

3) Shut down the system, verify the internal SCSI cable is installed correctly to the I/O bus, verify all external cables are seated correctly, make sure the differential SCSI terminator is attached to the last drive, and verify all drives have a unique SCSI ID. Power the system back up. If you have a terminal connected to the CSMU, select menu item 2, **Monitor Units**, to check if the host adaptor recognizes the drives. Otherwise, boot the system and check if the O/S recognizes the devices.

4) If there are multiple drives on the subsystem, detach all subsequent drives and put the SCSI terminator on drive 0. Then power up and check for drive recognition. A bad drive could disrupt the SCSI bus resulting in invalid information.

Fatal controller Errors

1) The DCL **Backup** command gets fatal controller errors.

SOLUTION:

This is a generic error returned by the backup command. It can be caused by various things. The format of the error output has many variations. The following is one example of error output:

```
BACKUP-F-POSITERR error positioning MUA0:[]
      SYSTEM-F-CTRLERR fatal controller error
```

Follow the following procedures in the order listed below, until the problem is diagnosed.

1) Consult the VMS documentation for explanation of many of these errors.

2) Connect a terminal to the serial port and select menu item 2, **Monitor Units**. This will display the read/write error rate that the tape drive is encountering. Initiate the backup command from VMS that caused the fatal controller error, using the same tape cartridge. Monitor the error rate during the backup process. An error rate continuing at greater than 5% is not acceptable. Proceed to Step 3 if an unacceptable error rate is recorded.

3) Clean the tape drive witha cleaning kit. Dirty heads can cause a fatal controller error.

4) Try a different tape. If the media is bad it can cause many re-reads or re-writes on the tape drive resulting in a fatal controller error

5) Read and write to the tape drive indepentently of the O/S, using the CSMU.

6) Try a different tape drive. If the subsystem has multiple tape drives, try the same backup on another drive.

If the other tape drives works, replace the tape drive that causes the fatal controller error.

If the other tape drive does the same thing, replace the DCMS-TSB host adaptor.

Bus Error During Self Test

```
ABCDEFGHI
 Bus Error at pc: 1CEC Fault Addr: 6000E0F8
      680020 Registers
                DO-D3: 1 1 E000C
                D4-D7: FD6FF9FFF 1 FFFF 8000
                A0-A3: B0000000 6A5A 200004D0 6000E000
                A4-A6 A0000000 FBEFEBF9 20008000
Exception Stack: 27100000 1CECB008 E2C0145 67046000 6000E0F8
```

1) On power up, the previous information is displayed on the screen

SOLUTION:

The DCMS-TSB board could not intialize because a bus error during the self test. Follow the following steps until the problem id diagnosed.

1) Reseat the board and power up again. A bus error can result of a bad connection to the BI bus. Part of the self test performs BI bus cycles.

2) Reseat the internal SCSI cable and power up again.

3) Disconnect the internal SCSI cable from the back of the BI bus and power up again. Self test intializes the SCSI interface chip.

4) Try a different BI slot. If none is available, clean the one you are using. Power up again. If a BI slot has not been used at all or has been emty for a long time, oxidation can build up on the contacts.

5) Show Device MU

7) Host Unavailable. VMS lost communications with controller. Use CSMU to test board. "Rebooting will rectify problem."

[illegible]

PROBLEMS WITH VMS 5.3-1

1) There are some problems with general slowness and /assist Patch 101 fixes these problems.

2) Standalone backup will hang the system intermittently if the /log option is used. Try to halt and restart the CPU to get it running again

INTERGRAPH:

3) Users with Intergraph graphic controller may experience crashes and other problems due to 3rd party boards not emulating any DEC card. Try moving the TSB to another BI card cage if possible.

FIRMWARE:

4) Firmware revs AK2 and BC1 could cause a problem which manifests itself as a fatal controller error, error postioning MUA0. With the support of the copy command, the search for file markrers has been slowed down to the point where the tape drives time out. Problem may occur when tape drive is rewound then searched for a specific file.

FOREIGN DEVICES:

5) Foreign devices are not recommended with any part of the TSB controller.
Incorrect termination to the controller can cause a tape drive to malfuntion.
If the termination is incorrect, it can cause the tape access door to jam shut.
The TSB provides power to termination and foreign devices that are not compatible may damage the controller.

The DCMS-TSB host adaptor displays various messages during operation. The disriptions of these messages are listed below.

68020/ COMIC Device Runtime Messages

The following two messages are indicative of a fatal controller error. The fault could be with the DCMS-TSB host adaptor, or some other device in the system, or could be resolved by reseating the host adaptor or trying another slot.

```
"Unexpected Exception Vector 0x at pc:
   68020 Registers
              D0-D3
              D4-D7
              A0-A3
              A4-A6
 Exception Stack: "xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx"
```

68020 Bus Error Exception Message

```
" Bus Error at pc:xxxx Fault Addr: xxxxxxxxx
     68020 Registers
               D0-D3
               D4-D7
               A0-A3
               A4-A6
Exception Stack: "xxxxxxxx xxxxxxxx xxxxxxxx xxxxxxxx"
```

Comic Device Bus Error Messages

"Error Int: xxxx"	Comic device detected a VAX bus error and the VAX CPU was sent an error interrupt.
"BERR: xxxx"	Comic device detected a VAX bus error.
"SCSI Parity error"	This message means that a SCSI Bus Parity Error was detected by the DCMS-TSB, and means that the integrity of the SCSI Bus is suspect. Typically it is a cable seating problem or a problem with DCMS-TSB seating in the VAXBI card cage.
"ASP Error"	This is an internal error message indicating that an illegal ASP command has been received by the ASP (Advanced SCSI Processor) on the DCMS-TSB, probably caused by a malfunctioning tape drive or host adaptor.

SCSI ID NOT ACCESSABLE:

Sometimes during a process the TSB controller cannot access one of the drives. By doing a SHOW DEVICE MU, VMS will display the device, but the drive cannot be acccessed. The CSMU might become disabled and therefore making it impossible to access the drives for testing. If MUA0 is the drive that cannot be accessed, switching the SCSI ID on the drives will show that MUA0 will still be disabled.

If the customer has a two drive configuration and one of the drives cannot be accessed a quick fix is to make the disabled drive a SCSI ID not being used.
Example: Make MUA0, MUA2 and this will allow the drive to be accessed.

Another solution is trying a soft reset of the drive. This is done by powering the tape drives off and on slowly trying to free up the controller or VMS command that is hanging the device.

If all else fails, reboot the system. This will reset the TSB controller.

TAPE ACCESS DOOR:

When installing a tape into the drive or removing one. Make sure that proper termination is maintaned on the SCSI bus. By not having the terminator installed in the SCSI connector on the back of the drive, the access door will not operate correctly. The most consistant way of maintaining proper operating parameters for the access door is to have the drive hooked up to an active TSB controller Having the drive stan
proper functioning of the drive.

You can set baud rate and password by using the EEPROM manager.

```
Enter choice: e
      ************ Clearpoint EEPROM Manager ************
Revision 4-11-1990 10:47:56                Copywrite (c) Clearpoint 1990
1      Set Baud Rate
2      Set Passwords
X      Return to CSMU main menu
```

Select to re-set the baud rate from 9600 to a preferred speed

```
Enter choice: 1
```

Select 2 to set the baud rate of 1200

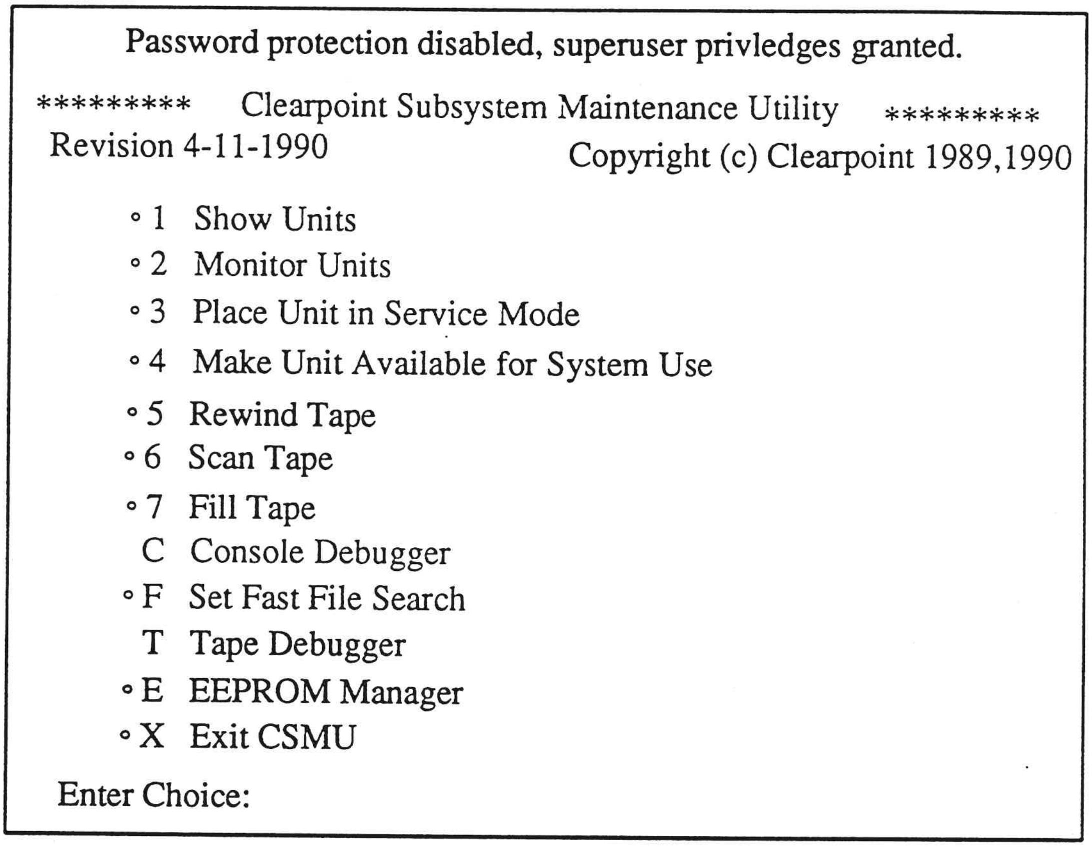
```
Enter desired baud rate (9600=0, 2400=1, 1200=2) : 2
Type a key when ready for 1200 baud.
Type any key to return to menu:
```

Re-set the baud rate on your terminal to match the baud rate set in the CSMU.

Select menu item 2 to set passwords. Enter Superuser (engineering level) and user (system operator) passwords of 6 to 11 characters. The Superuser password provides access to all menu levels. The User password provides access to menu items 1-7, E and X.

```
Enter choice: 2
Password protection will be re-enabled.
Enter new Superuser Password:*******
Enter new User Password:*******
Type any key to return to menu:
```

Enter X to exit from EEPROM Manager.



```
Password protection disabled, superuser privledges granted.
*********    Clearpoint Subsystem Maintenance Utility    *********
 Revision 4-11-1990                    Copyright (c) Clearpoint 1989,1990

          ∘ 1  Show Units
          ∘ 2  Monitor Units
          ∘ 3  Place Unit in Service Mode
          ∘ 4  Make Unit Available for System Use
          ∘ 5  Rewind Tape
          ∘ 6  Scan Tape
          ∘ 7  Fill Tape
            C  Console Debugger
          ∘ F  Set Fast File Search
            T  Tape Debugger
          ∘ E  EEPROM Manager
          ∘ X  Exit CSMU
  Enter Choice:
```

```
Enter choice: 2

Monitor Unit Status
Unit    Tape      I/O      Err     Pend    Last     Last SCSI
No.     Left      Rate     Rate    IO's    Cmd      Sense
 0     1800mb    240k/s   0.0%     4      Read
 1     2000mb    240k/s   0.1%     5      Write
```

The Unit column shows the SCSI ID of the drive.

The Tape Left column indicates the storage capacity from the current position of the tape on the drive heads to the end of the tape (approximately how much capacity is remaining).

The I/O Rate column displays the average transfer rate during the 6 second interval being reported

The Error Rate column shows the percentage of 1 K blocks that required re-reading or re-writing during the entire read or write operation. The error rate is reset to zero when switching from a read to write or vice versa. The error rates at the beginning of a read/write operation may appear high until the sample from which the error rates are calculated becomes larger. The early error rate may also be higher due to wear on the beginning of the tape itself.

The Pending I/O column indicates the number of queued requests from the host operating system for that unit.

The Last Command column reports the most recent SCSI command issued to that unit.

The Last Sense column provides the most recent status reported by the tape drive. A text message will be dispalyed. It is often blank since the majority of the work done by the drive is represented by the zero sense status, which is not displayed.

The DCMS-TSB host adaptor can run in 2 filemark search modes:
Fast File Search disabled and Fast File Search enabled. The host adaptor is shipped with Fast File Search disabled, allowing compatibilty with all operating operations.

If you are doing backup/verify of multiple large save sets to one tape cartridge, enabling Fast File Search will significantly increase the speed of the verification and file retrieval. In this mode however, all ANSI tape operations (copy, DIR) will not work.

The general guideline is if you mount/foreign in order to use the VMS backup command, you can run with Fast File Search enabled or disabled; but when mounting ANSI, you must first disable Fast File Search.

At the prompt, select menu item F to bring up the Fast File Search menu.

```
Enter choice: f

Fast File Search Mode
Unit  Fast Search Mode
 0    Yes
 1    Yes
 2    No
 3    No
 4    No
 5    No
 6    No
Do you wish to continue (y or n) : y
```

Enter Y if you wish to change the mode.

Enter the ID number of the unit to be changed.

Respond Y to change the mode, and Y again to save the change.

```
Enter Unit to Change File Search Mode: 0
Do you wish to Enable Fast File Searches on unit 0 (y or n)?:
Write Change to EEPROM (y or n)? : y
EEPROM Modified
```

HPME-93P: Feb 28, 1990
Chris Martel(PSE), Farbod Khaghani(Design), (Tech)

BOARD DESC: Add in memory array card for HP series 9000 Model 350s and 370. This is just an array card and it attaches to a memory controller provided by Hewlett Packard(Clearpoint soon).

VERSION:	TECHNOLOGY:	CAPACITY:
HPME-93P/4MB	1Mbit DIP	4MB
HPME-93P/12MB	1Mbit DIP	12MB

PROCESSORS:

Series 9000 model 350	68020 microprocessor 25Mhz
Series 9000 model 370	68030 microprocessor 33Mhz

BACKPLANE: uses version of VME bus

SLOTS: Normal system has 4 slots.
slot1 - Video
slot2 - IO
slot3 - CPU
slot4 - Memory
This system is not slot dependent, although the memory card will not fit in the top slot (slot 1). The only stipulation is the memory card must reside next to the CPU card, since the two boards are connected via a tophat-type connector.

You can buy a bus expander which will give you an additional 4 slots.

CPU ON-BOARD MEM: No Memory on CPU. The controller has 4MB on board and can have a maximum of 16MB with 12MB array.

MAX MEM CAP: 32MB, using 3 memory controllers and expansion bus chasis using parity memory (48mb using ECC memory).

TERMINATOR: No terminator

ERROR CHECKING: Parity

JUMPERS: Addressing on memory controller. If multiple memory controllers you must adjust addressing.

DIAGNOSTICS: Power up diagnostics, also ROM diags that loop testing memory.

TROUBLESHOOTING:

IMME-16B
IMME-32B   Date: Sept 6, 1990
Nate Harel(PSE), (Eng'g), (Tech)

BOARD DESC:

	Clearpoint	IBM
16 bit MC Bus	IMME-16B (Uses SNXSM/S1-80: 4 banks, 2 SIMMs/bank)	16-bit (#6450609) (Uses IMME-78P) 16-bit (#1497259) (Uses 16-bit IBM memory modules only)
32 bit MC Bus	IMME-32B (Uses SNXSM/S1-80 or SNXSM/S4-80: 2 banks, 4 SIMMs/bank, OK to mix 1 and 4MB banks)	32-bit (#6450605) (Uses IMME-78P) 32-bit (#34F3011 or #34F3077) (Uses IMME-78P/2MB or /4MB)
16 bit mem Bus	N/A	512KB 30F5348
		2MB 30F5360
32 bit mem Bus	IMME-5RA/1MB	N/A
	IMME-78P/1MB IMME-578/1MB	6450603
	IMME-78P/2MB IMME-578/2MB	6450604
	IMME-78P/2MB IMME-70A/2MB	6450608
	IMME-78P/4MB	34F2933

ERROR CHECKING:

JUMPERS:

	SIMM SLOTS:	MC SLOTS:		
PROCESSOR:	32 bit	16 bit	32 bit	
30	does not apply			uses only PC/AT bus
50-021	0	3	0	
50Z-031	1	3	0	zero wait states
50Z-061	1	3	0	zero wait states
55SX-xx	2	3	0	
60-xx	0	7	0	
65SX-xxx	4	8	0	
70-E61	3	1	2	16MHz
70-121	3	1	2	20MHz
70-A21	4	1	2	25MHz (can use -70A)
80-041 * -071 -111 -311	0	3	3	

P70-xxx

* 4MB on special memory board. 1 board/system.

DIAGNOSTICS:

CONFIGURATION NOTES:

- There are 16-bit and 32-bit Dedicated Memory Slots (on CPU) with different memory modules for each variety of slot (the 32 bit slot uses the IMME-78P). There are also 16-bit and 32-bit Micro Channel Slots which are genrally used for I/O. Memory can be added to this bus via a memory adapter. The IMME-78P can also be installed on the appropriate IBM Micro Channel Memory Adapter (which is then installed in the Micro Channel slot).
- MAX MEMORY IS 16MB WITH OS/2. HOWEVER, OTHER OPERATING SYSTEMS WILL ALLOW MORE THAN 16MB WHICH CAN ONLY BE ACHIEVED WITH THE IMME-16B OR IMME-32B.
- The Micro Channel Memory Adapter takes from 1 to 4 IMME-78P modules.

CONFIGURATIONS:

- Models 50 AND 50Z :
- Models 55ZXSX AND 60 :
- Models 65SX AND 70 :
- Models 70-A21 AND P70 :
- Model 80

MICRO CHANNEL

* The Micro Channel is an IBM developed bus for PCs

* Used for peripheral options as well as additional memory

* There are 16-bit Micro Channel buses or 32-bit Micro Channel buses

* Memory modules do not fit directly into the Micro Channel bus but onto a Micro Channel Memory Adapter

TROUBLESHOOTING:

Error Message '165'
When you run Set Configuration, you receive a message indicating that an error occured while reading an option adapter file or the View Configuration screen shows that an unrecognized adaptor is installed.

Cause: your Reference Diskette does not support the MicroRAM 386 Adapter Description file: versions prior to 1.06 of the Model 70/80 IBM Reference Diskette and 1.00 of the IBM Model 70 portable Reference Diskette do not support the MicroRAM 386 Adapter Desription File.

Solution:
Obtain an upgrade from your dealer.

As a temporary solution, the \M386 subdirectory on your MicroRAM 386 contains programs that can use to eliminate the error message and install the MicroRAM 386 board.
Insert your DOS diskette and reboot your system. You will recieve a 165 error.
Press F1 to continue.
Insert your MicroRAM 386 diskette. Enter the following:

```
>CD\M386     (change to the \386 subdirectory)
>COPYOP      (copy the adapter desription file to your Reference Diskette)
```

Run Automatic Configuration from the Set Configuration menu of your Reference Diskette. This will eliminate the 165 error.

Next, run the MicroRAM 386 INSTALL program. Enter the following:

```
>CD\M386       (change to the \M386 subdirectory)
>INSTALL
```

While using your computer's Reference Diskette in the future, you may find that your MicroRAM 386 memory has been disabled. If this occurs, you must repeat the steps above. For convenience you may wish to copy the MicroRAM 386 INSTALL program to a subdirectory on your hard disk. To eliminate this recurring problem, upgrade your reference Diskette.

164 (Memory Size Error):

- check that SIMMs are installed in banks and are all of the same type
- check SIMM seating
- check the settings for Wait States and Matched Memory Cycle under Adjustable Board Parameters on the Tecmar Adavanced Memory Options screen (they must match the speed of your SIMMs).
- run diagnostics. Run Automatic Configuration from your Reference Diskette and press any key to activate the Tecmar Adavanced Memory Options/Diagnostics menu. Select Run MicroRAM 386 diagnostics to check your board and memory modules. If any errors are detected, contact your Tecmar dealer. If no errors are detected, select Run Automatic Configuration.

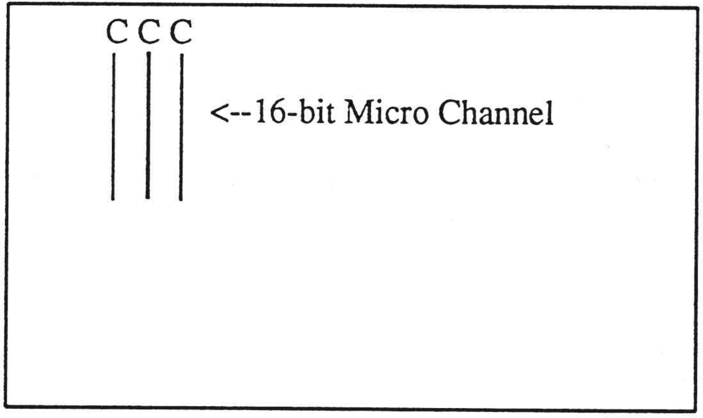
Error Message '110 or 111 Parity'

- check to see that all of your SIMMs are fully seated in their slots.
- check the settings for Wait States and Matched Memory Cycle under Adjustable Board Parameters on the Tecmar Adavanced Memory Options screen (they must match the speed of your SIMMs).
- run diagnostics. Run Automatic Configuration from your Reference Diskette and press any key to activate the Tecmar Adavanced Memory Options/Diagnostics menu. Select Run MicroRAM 386 diagnostics to check your board and memory modules. If any errors are detected, contact your Tecmar dealer. If no errors are detected, select Run Automatic Configuration.

When installing two MicroRAM 386 boards, one is not recognized at POST

- check that each MicroRAM 386 board works alone
- check the settings for Wait States and Matched Memory Cycle under Adjustable Board Parameters on the Tecmar Adavanced Memory Options screen (they must match the speed of your SIMMs).
- run diagnostics. Run Automatic Configuration from your Reference Diskette and press any key to activate the Tecmar Adavanced Memory Options/Diagnostics menu. Select Run MicroRAM 386 diagnostics to check your board and memory modules. If any errors are detected, contact your Tecmar dealer. If no errors are detected, select Run Automatic Configuration.

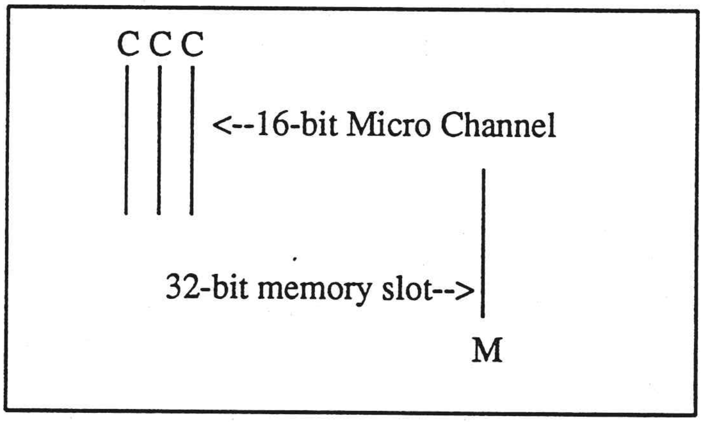
Model 50 (desktop)



C = Micro Channel
M = 32-Bit Dedicated Memory Slot

There are no 32-bit Dedicated Memory Slots.

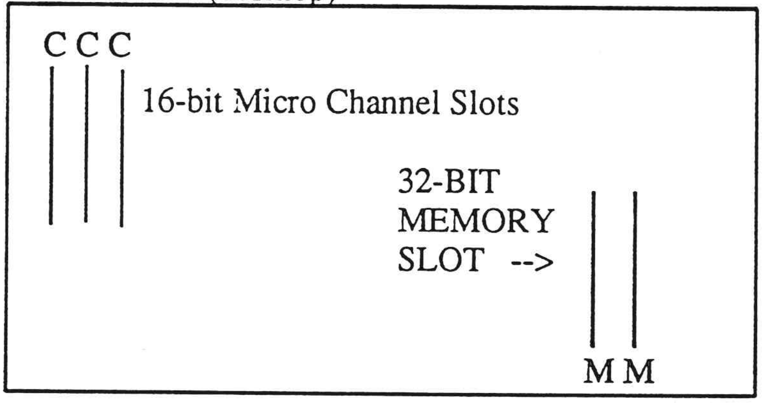
Model 50Z (desktop)



C = Micro Channel

M = 32-Bit Dedicated Memory Slot

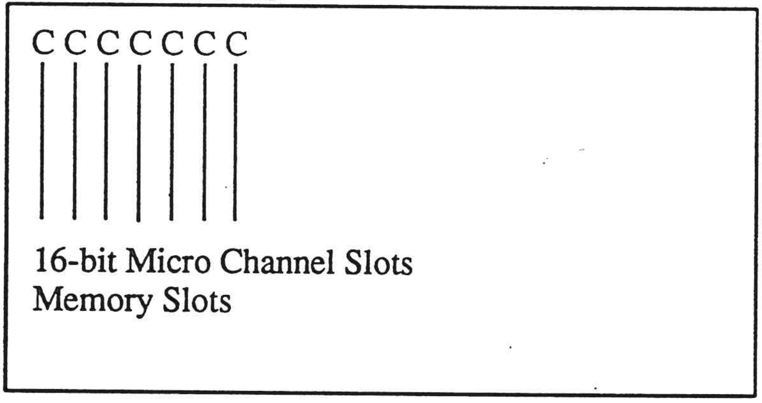
Model 55SX (desktop)



C = Micro Channel

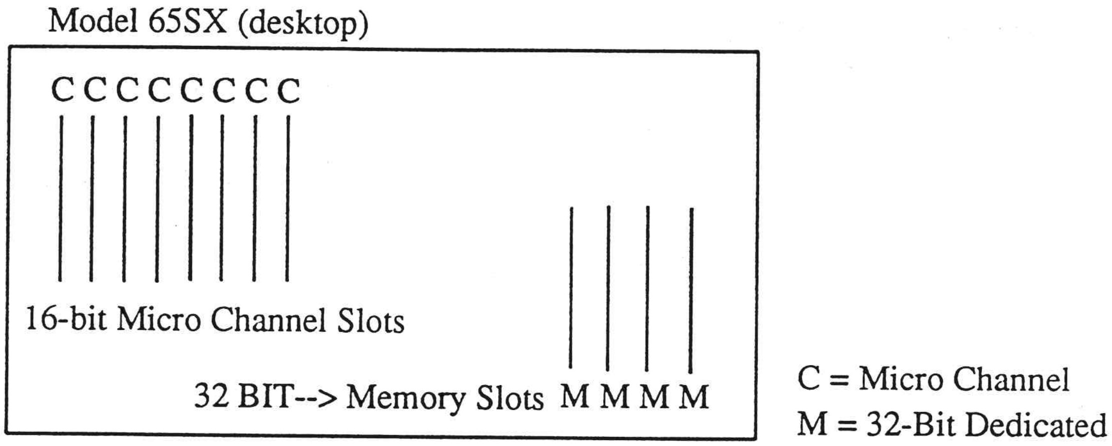
M = 32-Bit Dedicated
Memory Slot

Model 60 (desktop)

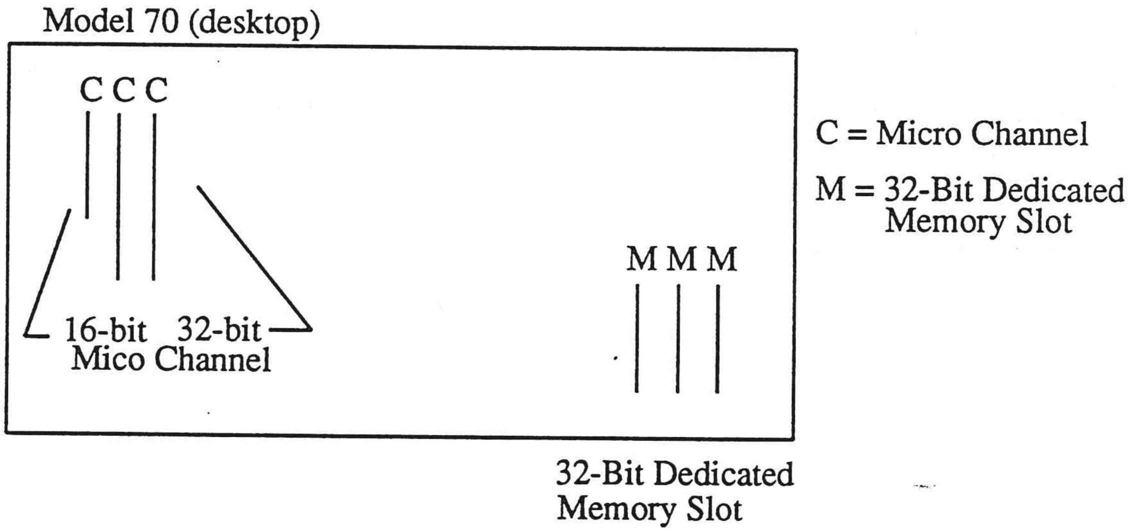


C = Micro Channel
M = 32-Bit Dedicated
Memory Slot

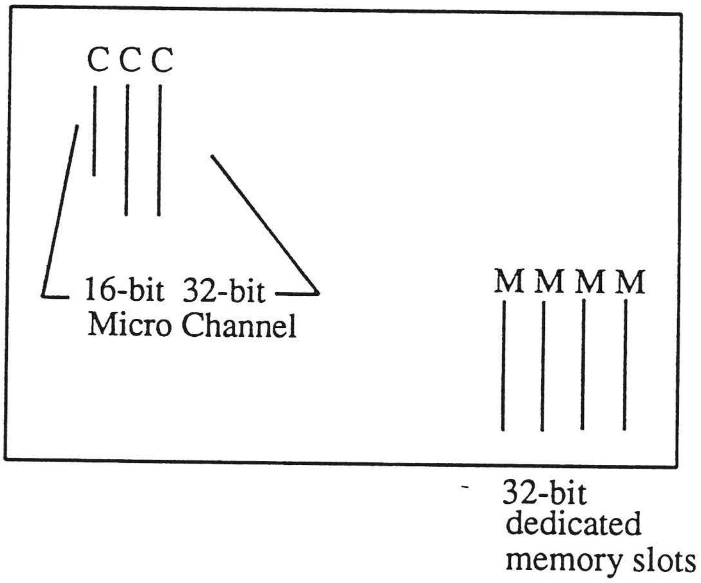
There are no 32-bit Dedicated
Memory Slots



PS/2 MODEL 70-E61 AND 121

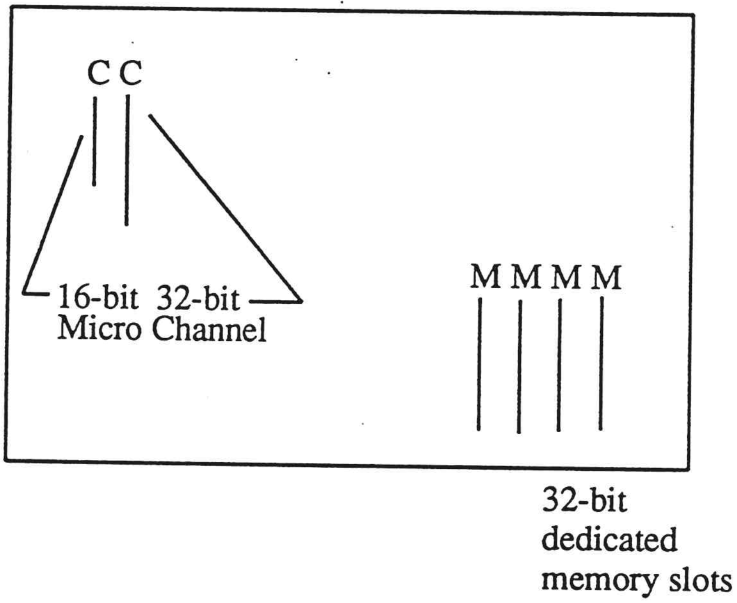


PS/2 MODEL 70-A21



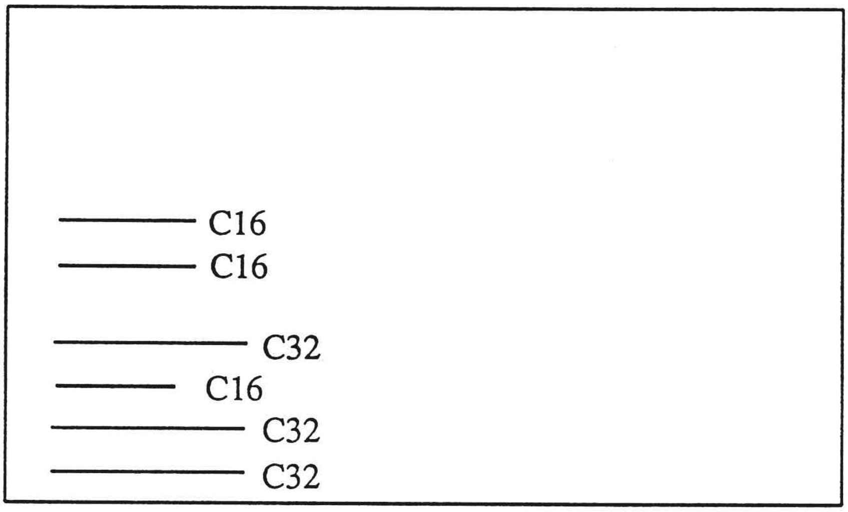
C = Micro Channel
M = 32-Bit Dedicated Memory Slot

PS/2 MODEL P70



C = Micro Channel
M = 32-Bit Dedicated Memory Slot

Model 80 (floor-standing model)



** There is one dedicated memory slot but is NOT a SIMM

* C16 = 16-bit Micro Channel

* C32 = 32-bit Micro Channel

There are no 32-bit Dedicated Memory Slots.

6. 2.

IMME-78P: (PS/2): July 2, 1990
IMME-578
IMME-5RA:
IMME-70A:
Nate Harel(PSE), Phil Schwartz(Design), Truc Nguyen(Tech)
BOARD SIZE: SIMM

VERSION:	TECHNOLOGY:	IBM EQUIV:
-578/1MB	8 256KbX4 SOJs plus 4 256KbX1 SOJs (parity)	6450603 (85ns)
-5RA/1MB		NONE
-578/2MB	16 256KbX4 SOJs plus 8 256KbX1 SOJs (parity) ***OBSOLETE***	6450604 (85ns)
-70A/2MB		6450608 (80ns)
-78P/xMB*	16 256KbX4 SOJs plus 8 256KbX1 SOJs (parity)	6450604 (85ns) 6450608 (80ns)

* the new version of the /2MB has a small switch block on it.

IBM PARTS:	32 bit MC expansion adapter	6450605
	16 bit MC expansion adapter	1497259
	16 bit wide 512K SIMM	30F5348
	16 bit wide 256K SIMM	30F5360

	SIMM SLOTS:	MC SLOTS:		
PROCESSOR:	32 bit	16 bit	32 bit	
30	does not apply			uses only AT bus
50-021	0	3	0	
50Z-031	1	3	0	zero wait states
50Z-061	1	3	0	zero wait states
55SX	2	3	0	
60	0	7	0	
65xs	4	8	0	
70-E61	3	1	2	16MHz
70-121	3	1	2	20MHz
70-A21*	4	1	2	25MHz (can use -70A)
80-041 -071 -111 -311	**	3	3	

* Requires -70A's or IMME-78P/2MB with the switches set
** 4MB on special memory board. 1 board/system.

CPU ON-BOARD MEM: none

MAX MEM CAP: 16 MB

MIN MEM INCREMENTS: 1 MB

SLOT DEPENDENCY: none

TERMINATOR: none

ERROR CHECKING: parity

JUMPERS: none

SWITCHES: A 4 position switch on the IMME-78P which must be set for the individual system.

	1	2	3	4
70-A21 System board only	UP	DOWN	DOWN	UP
50z-031, 061 70-E61, -121 80-041, -071 80-111, -311	UP	DOWN	UP	DOWN
32-Bit Microchannel Memory Adaptor	UP	DOWN	UP	DOWN

DIAGNOSTICS: Self-test diagnostics at power on. Also, reference diskette contains diagnostics.

Memory Verification:
System counts up to total system memory on screen during self test. Also see Configuration Notes below for info on reconfiguring memory.

TROUBLESHOOTING:
Common Failures:
1) verify the switch settings on the SIMM (for -78P only)

CONFIGURATION NOTES:
- Model 70-A21 requires a the IMME-70A (which is obsolete) or the IMME-78P with the correct switch settings.
- NOTE: Switch settings shown are for installation into the system board slot. Setting for installation onto the adapters are different. The 70-A21 system board only accepts 2MB modules.
- Clearpoint SIMMs may be installed into the 16-bit Micro Channel Memory Adapter (IBM #6450609) which hold up to 4 modules.
- Clearpoint SIMMs may be installed into the 32-bit Micro Channel Memory Adapter (IBM #6450605 or #34F3011/3077) which hold up to 4 modules.

INSTALLATION NOTES:
- After installing additional memory, use the Reference Diskette to reconfigure the memory. To start, insert the diskette and power up or reset the CPU.

IMME-A83 (IMME-400): September 21, 1990
Nate Harel(PSE), Lou Bezdek(Design), Joan Tognacci(Tech)

BOARD DESC: custom IBM type metal and plastic enclosure with ZIF connector - 80 bit wide memory array

VERSION:	TECHNOLOGY:	MFR EQUIV:	
/4MB	256Kbx4 ZIPs	3054	
/8MB		3055	
/16MB		3060	
/16MB-70		3061	for model 70 only

Note: The /16MB-70 has been replaced by the /16MB which has a switch to emulate either the IBM 3060 or 3061.

PROCESSOR:	MEMORY SLOTS:	MAX MEM CAP:	
30	3	36MB	
35	3	40MB	
40	3		
45	3		
50	3	48MB	
60	6	96MB	
70	6		

CPU ON-BOARD MEM: none

MIN MEM INCREMENTS: 4MB on models 30-50; 16MB on models 60-70

TERMINATOR: none

ERROR CHECKING: EDC by CPU (64 bit word comprised of 2 32 bit segments, each with 7 EDC bits. Also one tag bit and one undefined bit for a total of 80 bits wide)

NOTE: Most errors will be handled by ECC. If a problem that cannot be handled is encountered by the system, it may or may not crash. If it does not, it will map out the bad memory dynamically. If it does crash, it will re-boot and map out the bad memory automatically. Certain memory errors may prevent the system from rebooting. If so, error messages may help isolate the bad board. In either case, the bad board will have to be isolated via swapping.

JUMPERS: none

SWITCHES: The /16MB version has a switch by the handle. On the board there are markings 3060 and 3061. When set in the up position it is only for the Model 70. When set in the down position the board is set for the rest of the models. NOTE: Only the /16MB board has the switch since the Model 70 only accepts 16MB memory boards.

DIAGNOSTICS: no user-controllable diagnostics available
Memory Verification: run Work with System Status program and calculate the total pool size (to yield the total memory size (in KB))

TROUBLESHOOTING:

Common Failures:

1) If System Attention light stays on after power up, use Emergency Power switch to turn power to the system off. Reseat the board, paying close attention to the ZIF connector levers.

2) If the memory is at fault, an error message should be generated calling out MSxx at login time (where xx is the memory board number)

3) Improper memory pool allocation. The following error message:

```
MESSAGE . . . . .: LINE WAREHOUSE FAILIED.  LOCAL CONFIG  ...
CAUSE...NOT ENOUGH RESOURCES...
RECOVERY...
```

indicates there the QBASPOOL is too small.

To enlarge the QBASPOOL (the memory pool):

- turn the front panel switch to 'MANUAL'
- reboot the machine
- select menu item 1: Select IPL (Initial Program Load)
- login as security officer
- on the IPL menu, set "Define or Change System at IPL" to 'Y'
- select item 3 (System Value Commands)
- select item 2 (Change System Value)
- under 'System Value', enter 'QBASPOOL'
- tab to the next field, 'New Value'. Enter new value (current amount plus 15%-25% of the memory upgrade. i.e. if you install a 16MB board, increase the value by between 2400 and 4000 KBytes)
- continue with the IPL
- repeat the process with small increments or decrements to 'NEW VALUE' until the system is tuned

Known Bugs: none

CONFIGURATION NOTES: IBM 16MB board(s) should be in leftmost memory slot(s)

INSTALLATION NOTES:

Upon powering up, the System attention should go off. If not, see item 1 under Troubleshooting (above).

RTRAM: May 30, 1989
Nate Harel(PSE), Phil Schwartz(Design), Truc Nguyen(Tech)

BOARD SIZE: 13" x 4.5"

VERSION:	TECHNOLOGY:
/4MB	256Kb DIPs
/4MB	256Kb ZIPs
/8MB	1Mb DIPs

PROCESSORS: 6150, 6120, 6125, 61125, 61A25, 61B25, 6151, 6110, 6115, 61115

MEMORY SLOTS: 2 (C and C)

CPU ON-BOARD MEM: 6151/115, 6150/125, 6150/B25 have 4 MB on CPU

SLOT DEPENDENCY: larger board in slot C

TERMINATORS: no

JUMPERS: W4 (processor speed)

ERROR CHECKING: EDC (actual checking done on CPU)

DIAGNOSTICS: diagnostic diskette (see chapter 3)

TROUBLESHOOTING:
Common Failures:
1) Check the setting of jumper W4 to verify it is corect for your system's CPU speed.
- See manual section 2.3.3.3
2) Check the configuration to verify that it is legal.
- the larger capacity module should be in slot C
- if the system has an AT coprocessor with 512 KB memory expansion option, see manual

Known Bugs: none

SNME-330: August 10, 1990
Jim Stiles(PSE), Phil Schwartz(Design), (Tech)

BOARD SIZE: VME '3u'

PART:	TECHNOLOGY:	
/8MB	1Mb 80ns SOJs	
/16MB		
/32MB		
/32MB	4Mb 80ns SOJs	
/64MB		
/128MB		

PROCESSOR: Sun 4/330

CPU ON-BOARD MEM: 8 or 32MB (using 1 or 4MB SIMMs)

SLOTS: 2 '3u' slots (specially wired P3 connector)

SLOT DEPENDENCY: fill slot closer to processor first

TERMINATORS: no

ERROR HANDLING: parity

JUMPERS: none (actually there are soldered-in jumpers)

DIAGNOSTICS: standard Sun power-up diagnostics. Also, standard Sun diagnostic LEDs

TROUBLESHOOTING:
Common Failures:
1) System hangs with screen dark, LED's hung - remove memory and check PROM revision level. See Configuration Notes below.

Known Bugs:

CONFIGURATION NOTES:
- A 32MB cannot be placed in slot1 next to an 8MB board
- Rev 3.01 and 3.02 supports 48MB of total meory
- Rev 3.03 supports 96MB of total memory

To boot the system if the maximum memory limitations of the ROM have been exceded, follow the following steps:
a) Set the CPU in diag mode.
b) Attach a dumb terminal to port A.
c) Boot the system
d) Using the dumb terminal, exit the diagnostics (using the appropiate escape sequence) before the failing diagnostic starts.
e) Re-enter the normal mode (switch back from diag mode) and the system should boot normally.

Note: This procedure will not work with Rev 3.03

SNME-350: June 8, 1990
Jim Stiles(PSE), Phil Schwartz(Design), Truc Nguyen(Tech)

BOARD DESC:
Rev B: Main daughter board and 3 other daughter boards
Rev D: Main daughter board and 2 other daughter boards (no CPU)

PART:	TECHNOLOGY:
/4MB	1Mb DIPs, 1/2 populated
/8MB	1Mb DIPs

also: SNME-350/TSET; for Rev B or for Rev D
APCA-SNME-350/CPU
APCA-SNME-350/MMU
APCA-SNME-350/PCK

CPU ON-BOARD MEM: 4MB

MAX MEM CAP: effectively 12 MB

ERROR CHECKING: parity

JUMPERS: on Clearpoint array card: W1 (4/8MB) - jumper set->8MB

DIAGNOSTICS: power-up self test, ROM diagnostics, and system diagnostics (from UNIX)
Memory Verification: automatic on power up. Also at console prompt type 'KB'.

CPU LED diagnostics:
- 7 off, 0-4 counting up (binary) - tests are running
- 6 lights - bus error
- 5 flashing on - heartbeat has started (starts after diags)
- 'walking' pattern of LEDs - UNIX is running

TROUBLESHOOTING:

Common Failures:

1) System won't boot in normal mode even though everything seems OK (it will start up in diag mode). Reset EEPROM locations 14 and 15 with correct amount of memory.

2) If the problem is a parity error or other error attributable to a bad DRAM and you are using an 8 MB board, remove the W1 jumper to effectively reduce the daughter board to 4MB. This may enable the board to operate if the bad DRAM is on the disabled portion of the board.

NOTE: Due to the mechanical complexity of this product, connector seating is a very common problem. For most failures, reseating connectors, PALS, socket extenders, etc should be tried. Related problems include:

- LEDs hang and then restart, cycling infinitely: check PAL orientation and seating, check cable connectors (metal tabs should be latched)
- board fails after running awhile: check seating of the PAL socket extenders, make sure that there are TWO extenders

For step by step help in troubleshooting the product by backing it out, see:

- De-Installation:

Known Bugs:

INSTALLATION NOTES:

For assistance with an installation, contact Polaris Service, Inc. at 1-800-541-5831 or 1-508-562-2495

Before proceeding, make sure that Q14 and Q15 are set to 4MB. If they aren't, the power up diagnostics will hang

- Disengage either end of the ribbon cables connecting the small daughter cards to the large array card (in Rev BP there are three cables; in Rev DA there are two): this disables the Clearpoint memory array so that the system will only recognize the SUN 4MB. This verifies that the PALs and the PCHK and MMU (and in Rev BP boards, the CPU) modules are installed properly.

If the system continues to fail:

- Deinstall the array card: check that PAL 520-1288 is installed at location K3, PAL 520-1287 is in location K4. Check that the PALs and the socket pins are not bent or broken.

If the system continues to fail:

- Deinstall the CPU adaptor (only applicable in Rev BP product)

If the system continues to fail:

- Deinstall the PCHK adaptor

If the system continues to fail:

- Deinstall the MMU adaptor

If the system still fails:

- There may be a problem with the customer's system.

SNME-3E: February 7, 1990
Jim Stiles(PSE), Derek Gartland(Design), (Tech)

BOARD SIZE: VME 6u

PART:	TECHNOLOGY:	
/4MB	1Mb 80ns DIPs	
/8MB		
/12MB		

*8MB version not currently offerred

PROCESSOR: Sun 3/E (communicates with memory over the P2 bus, which is NOT the same as the VMX bus)

SLOTS: system dependent; max of 4 3E slots (1 CPU plus 3 mem)
NOTE: The VME bus is located on P1, pins rows A-C, and P2, pins row B. The P2 Bus (the proprietary Sun memory bus) is located on P2, pins rows A and C.

CPU ON-BOARD MEM: 4MB

SLOT DEPENDENCY: in any 3/E slot. Due to possible issues with bus grants, it is suggested that memory boards be contiguous with the CPU (most 3/E busses do pass grants, but just in case our board has been reconfigured to pass grants so you are guaranteed no problems with grant continuity as long as boards are contiguous).

TERMINATOR: no

ERROR HANDLING: parity

JUMPERS:
W2-W3: starting address - W3->4MB, W2->8MB (both->12MB)
W1,W4: memory size - (neither->4MB), W1->8MB, W4->12MB

SIZE (MB)	STARTING ADDR	W1	W2	W3	W4
4	400000	0	0	1	1
4	800000	0	1	0	0
4	C00000	0	0	1	1
8	400000	1	0	1	1
8	800000	1	1	0	0
12	400000	0	0	1	1

DIAGNOSTICS: standard Sun power-up diagnostics. Also, standard Sun diagnostic LEDs

TROUBLESHOOTING:
Simple Debugging Options:
1) remove all jumpers from the board and try again (removing the jumpers should make the board invisible to the system in a logical sense).

Known Bugs:
1) CPU ROM Rev 2.30-SFD: extended diagnostics run on memory locations 400000-7FFFFF cause the system to hang

SNX2RAM: April 12, 1990
Jim Stiles(PSE), Gary Stevens(Design), Bob Chisholm(Tech)

BOARD SIZE: triple height extended eurocard (14.438"x15.750")

VERSION:	TECHNOLOGY:	SUN EQUIV:
/8MB	256 Kb 120ns DIPs	
/16MB-D	1 Mb 120ns DIPs	
/16MB-Z	1 Mb 120ns ZIPs	
/32MB-Z	1 Mb 120ns ZIPs	

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	MAX MEM CAP:
3/260(280)	5	7	32 MB (128 w/new PROMs)
3/470(460/480)	5	7	128 MB (?)
4/260(280)	5	7	128 MB

CPU ON-BOARD MEM: none

SLOT DEPENDENCY: memory should (preferably) reside in contiguous slots starting with a terminated board in slot 6 (farthest from the CPU). See CONFIGURATION NOTES for information on backplane jumpers.

ERROR CHECKING: EDC

TERMINATOR: slot 6, or slot 7 on 3/470 (most distant memory board). In addition in 3/470's, if a memory board is installed in slot one, the terminator pack should be transferred from the CPU to the memory board

◦ **OLD VERSION JUMPERS:**

◦ **NEW VERSION JUMPERS:**

DIAGNOSTICS: for the system, power up self test, extended diagnostics in ROM, and sysdiag in SunOS.
For the board itself, system-independent local memory diagnostics, and remote diagnostics via on-board communications port

Diagnostic LEDs:
DIS 0-3 (disable select)
any 8MB board - DIS0 comes on at power up, goes off after board is sized
16MB board - DIS0-3 all come on, and then two shut off after board is sized

Board Select	DIS0	DIS1	DIS2	DIS3
0	off	off	on	on
1	on	off	off	on
2	on	on	off	off

all 32MB boards - DIS0-3 all come on, and then all go off after board is sized.
CPU - flashes if the CPU is running, no flash if CPU is halted
CE - a correctable error was detected since last powered on
UE - an uncorrectable error was detected since the last reset
REF - refresh is working
DIAG - on while board is initializing, off when it completes. If board is in diag mode and LED lights, error detected by diags.

Memory Verification:
Size of memory is displayed on power up. To redisplay, type 'KB at connsole prompt ('>').

NEW VERSION JUMPERS

BOARD SELECT

BOARD SELECT	SELECT JUMPERS	3/2XX, 4/2XX 3/460, 3/480	3/470
0	▭ W1 ▭ W2 ▭ W3 ▭ W4	SLOT6*	SLOT1*
1	REMOVED W1 ▭ W2 ▭ W3 ▭ W4	SLOT5	SLOT2
2	▭ W1 REMOVED W2 ▭ W3 ▭ W4	SLOT4	SLOT3
3	REMOVED W1 REMOVED W2 ▭ W3 ▭ W4	SLOT3	SLOT7*

MEMORY SIZE

	W5	W6	W7
32MB	REMOVED	REMOVED	REMOVED
16MB	▯	REMOVED	REMOVED
8MB	REMOVED	▯	REMOVED

OLD VERSION JUMPERS:

W1-W4: board select - set=0 (W1 is low order bit)
(Sun board select: single jumper 0-3 -> ID 0-3)
W5-W6: number of CSRs
W7: block size select - jumper set=32MB block, unset=8MB

W5	W6	W7	board config
unset	set	unset	8MB, 1 CSR (all CPUs)
set	unset	unset	16MB, 2 CSRs (all CPUs)
unset	unset	unset	32MB, 4 CSRs (old 3/2xx CPUs)
unset	set	set	32MB, 1 CSR (most CPUs)

TROUBLESHOOTING:

Common Failures:

1) System won't boot - check to make sure mode switch on CPU board is set to 'norm', not 'diag'. ALSO, make sure memory board diag switch(es) are set to 'norm'.

2) Change the logical location of the boards using the memory location jumpers on the outside of the board.
NOTE: Board select jumpers work the opposite from Sun equivalent boards.

Known Bugs:

Sun ROM Rev 2.3 or earlier may generate "invalid page bus" error message during diagnostics if system has 8MB or more. Ignore this message.

ALM-2's have been reported to fail with older CPU firmware (i.e. 1.5) and start working with newer firmware (i.e. 2.7)

ALM-2's work poorly with older rev SNX2's.

Rel 4.0.3 is known to handle certain memory error conditions improperly, leading to panic crashes. Contact Sun for a bug fix.

When booting over ethernet, there is a timing problem when the operating system loads into memory. If the system uses Clearpoint memory alone the system will not boot. If the system is using both SUN and Clearpoint memory, change the board select so that the higher order memory(higher select) is addressed to the SUN board with the Clearpoint memory addressed as the lower board select(s). This will allow the operating system to load into Sun memory.

CONFIGURATION NOTES:
With recent revs of CPUs and PROMs on Sun 3's, it should be possible to install up to 128MB. You must have PROM version 2.7 or higher on a CPU rev 12.06 level 10 (hand written on a tag attached to the back panel of the CPU). The system should be up to SunOS 3.5 (3.4 may work).

With this firmware in place, a 32 MB board need take only one CSR (as with both old revs of Sun 3 CPUs and all Sun 4s, an 8MB still takes one CSR and a 16MB still takes 2). Therefore the CSR/board select/memory location jumpers (W1-W4) should be set as they are for Sun 4's.

NOTE: when you run more than 32MB in a Sun 3/2xx the power-up self-diagnostics may generate an error. As long as the system runs properly, the error can be disregarded.

Backplane Jumpers: If the system seems to not recognize a board, you may need to reset the backplane jumpers BG3 and IACK for that slot. For the CPU, both jumpers should be out, for memory boards, both should be in, and other boards are random. This type of problem is quite likely if you have had to move boards in order to accomodate memory.

3/4xx systems - use different address lines, and so must have the appropriate configuration ECO to work. 3/4xx's can recognize 32MB CSR blocks (the same as 4/260's)

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SNXRAM: March 1, 1990

Jim Stiles(PSE), Brian O'Hara(Design), Joan Tognacci(Tech)

BOARD SIZE: triple height extended eurocard (14.438"x15.750")

PART:	TECHNOLOGY:	VERSION:
/4MB (obsolete)	256 Kb DIPs	SNX12
/8MB (obsolete)		
/12MB (obsolete)		
/4MB	1Mb DIPs	SNX28
/8MB		
/12MB		
/16MB		
/20MB		
/24MB		
/28MB		

	SLOTS:		
PROCESSOR:	MEMORY:	OTHER:	
3/75	1		
3/110	2	0	
3/140			
3/150	5		
3/160		6	
3/180			

CPU ON-BOARD MEM: 2 or 4MB

SLOT DEPENDENCY: memory must reside in contiguous slots as close as possible to the processor. In 3/160's and 3/180's only the first five slots can be populated with memory.
See CONFIGURATION NOTES for info on backplane jumpers.

ERROR CHECKING: parity

TERMINATOR NEEDED: no

JUMPERS:
SNX12:
W1-W2: board size (2,4,8 or 12MB) - left=low (W2 is low order)
W3-W7: starting address (2MB increments, 0-32MB) - left=low (W3 is low order)
SNX28:
W1-W3: board size (4MB increments, 4-28MB) - down=low (W1 is low order)
W4-W6: starting address (4MB increments, 0-2,4-28MB) - down=low (W4 is low order)
W7: ??? - always down
W8: ??? - always up

DIAGNOSTICS: power up self test, extended diagnostics in ROM, and sysdiag in SunOS

TROUBLESHOOTING:
Common Failures:
Known Bugs:
1) Some boards (either SNX12 or SNX28) may be incompatible with some CPU boards. At Array Systems we had 3 different boards in a machine and the only thing that helped was swapping the CPU (it is possible that the presence of an ALM1 board contributed to the problem).

7,5

CONFIGURATION NOTES:

PROM Revision Levels:
Rev. 1.5 sees a max of 24MB
Rev. 1.8-2.3 sees a max of 28MB
Rev. 2.6 sees 32MB

Sun ROM Rev 2.3 or earlier may generate "invalid page bus" error message during diagnostics if system has 8MB or more. Ignore this message.

OS Version Bug: For SunOS version < 3.4, configurations >8MB generate 'panic memall' message. Contact Sun for 'MAXUSER PATCH" or newer OS version.

Backplane Jumpers: If a board is not being properly recognized by the system, check the backplane jumpers BG3 and IACK. Both jumpers should be out for the CPU, in for memory boards, and misc other for other boards. Checking these jumpers is especially important if you have had to move boards to accomodate new memory.

3/160-type systems from Compugraphics - P2 and P3 wiring is an option in these systems, and is of course required for the SNX memory bus. Contact Dawn VME Products in Freemont, CA (415-657-4444) and ask about P/N's SUN0xJ2 and SUN0xJ3 (where x is the number of slots covered by the overlay).

JJ2 127 BA21
JJ2 313 CASWE3
JJ2 315 CASENB
JJ2 326 WRT
JJ2 132 BA25
JJ2 131 BA24
JJ2 130 BA23
JJ2 128 BA22
JJ2 373 BSACK
JJ2 318 RASEN2
JJ2 307 RASENB3
JJ2 321 REFRAS
JJ2 324 SIZE0
JJ2 323 SIZE1
JJ2 101 BAO
JJ2 102 BA1
JJ2 308 BRASTIMO
JJ2 121 ROW3
JJ2 107 BA5
JJ2 128 ROW7
JJ2 112 BA9
JJ2 123 ROW5
JJ2 110 BA7
JJ2 118 ROW1
JJ2 100 BA3
JJ2 311 COLSEL+
JJ2 120 COLSEL+
JJ2 120 ROW2
JJ2 106 BA4
JJ2 125 ROW6
JJ2 111 BAB
JJ2 122 ROW4
JJ2 106 BA6
JJ2 117 ROWO
JJ2 103 BA2
JJ2 115 BA11
JJ2 116 BA11
JJ2 118 BA12
JJ2 113 BA10
JJ2 328 BUFP1
JJ2 330 BUFP2
JJ2 331 BUFP3
JJ2 332 BUFP4

JJ3 209 BD08
JJ3 210 BD09
JJ3 211 BD10
JJ3 212 BD11
JJ3 213 BD12
JJ3 214 BD13
JJ3 215 BD14
JJ3 216 BD15
JJ3 217 BD16
JJ3 218 BD17
JJ3 219 BD18
JJ3 220 BD19
JJ3 221 BD20
JJ3 222 BD21
JJ3 223 BD22
JJ3 224 BD23
JJ3 225 BD24
JJ3 226 BD25
JJ3 227 BD26
JJ3 228 BD27
JJ3 229 BD28
JJ3 230 BD29
JJ3 231 BD30
JJ3 232 BD21
JJ3 201 BD00
JJ3 202 BD01
JJ3 203 BD02
JJ3 204 BD03
JJ3 205 BD04
JJ3 206 BD05
JJ3 207 BD06
JJ3 208 BD07

-1.G

SNXSM: June 27, 1990
Jim Stiles(PSE), Phil Schwartz(Design), Truc Nguyen(Tech)

BOARD DESC: SIMM, 9 chips (8 data, 1 parity). Both of the medium profile SIMMS (S1 and S4) have two rows of chips, one row of 4 and one oF 5.

VERSION:	TECHNOLOGY:	
SNXSM(obsolete)	1Mb 100ns DIPs	
-80 (obsolete)	1Mb 80ns DIPs	
SNXSC(obsolete)	1Mb 100ns DIPs	
/S1(obsolete)	1Mb 100ns SOJs .95"	
/S1-10(obsolete)	1Mb 100ns SOJs .8"	
/S1-80	1Mb 80/85ns DIPs	
/S4(obsolete)	4Mb 100ns SOJs .95"	
/S4-80	4Mb 80ns SOJs .95"	
/S4-80	4Mb 80ns SOJs .8"	

ERROR CHECKING: parity

	MEMORY CAPACITY:					
PROCESSOR:	MIN:	ADD:	MAX:	COMPATIBILITY:		
3/60	4	4	24	SNXSM	/S1-10	/S1-80
3/80 ∘ *	4	4	16	/S1-10	/S1-80	
				/S1-10	/S1-80	/S4-80
4/60 ∘ *	8	4/16	64	/S1-10	/S1-80	/S4-80
4/65 ∘ *	8	4/16	64	/S1-10	/S1-80	/S4-80
386i/150 ∘ *	4	4	16	/S1-10	/S1-80	
386i/150xp	4	4	16	/S1-80		
386i/250	4	4	16	/S1-80		
4/110	8**	16	32	SNXSM	SNXSM-80	/S1-80
4/330 ∘ *	8	8/32		/S1-10	/S1-80	/S4-80
4/370, 90	8	8/32		/S1-10	/S1-80	/S4-80

** the 4/110 comes fully populated with 32 256KB SIMMs (8MB)

- GENERIC COMPATIBILITIES:

NOTE: We DO NOT provide detailed technical support for the configurations described below. Neither will we upgrade these to other versions of SIMMs at a later date. However, our lifetime warrantee still applies.

SYSTEM: COMMENTS:
Acer 386/33 (unconfirmed) - /S1-80
Apple MacII ci - can use 256K, 1M, or 4MB SIMMs, either with or without parity. 80ns only.
Apollo DN2500
AT&T 6386 - /S1-80
Dell 310 - 8 SIMM slots in 2 banks (4 slots/bank), 256K or 1MB SIMMs, no mixing SIMMs (ALL either 256K or 1MB)-> legal SIMM configs of 1,2,4,8MB. Dell recommends 80ns parts, but at least has shipped some 100 ns parts Dell 325. /S1-80
Everex 386/25 (unconfirmed) - /S1-80
HP Vectra: QS/16 (16MHz 386). /S1-80 QS/20. /S1-80 RS/20. /S1-80 RS/25. /S1-80
Intel 386. /S1-80
MIPS R-3000 - SNXSM/S1-10, SNXSM/S4-10 25Mhz system w/ 32 SIMM slots, banks of 8. Don't know about mixing 1MB and 4MB SIMMs
◦ **Silicon Graphics:** Iris 4D20(personal Iris). /S1-80 and possibly /S4-80 Iris 4D25 (higher CPU speed). /S1-80 and /S4-80 we have a report from Betsy that both systems can mix 1 and a 4MB SIMM, for a max of 32B
Zenith 386/20 (unconfirmed) - /S1-80

◦ JUMPER and MEMORY CONFIGURATIONS:

JUMPERS: (systems not listed here have no jumpers)
4/110:
J100: 1*2 - set for 8 or 20MB
3*4 - set for 16 or 32MB
J400: 1*2 - set for 16 or 32MB
3*4 - set for 8 or 32MB
5*6 - set for 8, 16, or 20MB
J1300: 1*2 - set for 8 or 32MB
3*4 - set for 16 or 20MB
5*6 - set for 8 or 20 MB
7*8 - set for 16 or 32MB
9*10 - no jumper
11*12 - set for 8, 16, or 20MB
13*14 - set for 32MB
J1400: 1*2 - set for 8 or 32MB
3*4 - set for 16 or 20MB
5*6 - set for 8MB
7*8 - set for 16, 20, or 32MB
9*10 - no jumper
11*12 - set for 8, 16, or 20MB
13*14 - set for 32MB

3/60:
J1-J6: memory size (4,8,12,16,20, or 24MB) - down=set; set all jumpers equal to or smaller than the memory configuration
J7: EXTXUR - do not change! (normally down)
J8: HIGHRES - do not change! (normally up)

4/330, 370, 380, 390:
-'4MB' jumper must be SET on CPU board if 4MB SIMMs are used (removed for 1MB SIMMs)
-'4MB' jumper must be REMOVED on memory expansion board if populated with 4MB SIMMs (set for 1MB SIMMs)
-sizing jumpers must be set on expansion board(s) depending on how many banks are populated

DIAGNOSTICS: self test on boot up, and extended diagnostics from monitor prompt (type 'x' for most systems) on many systems. Also, full diagnostics may be available from /usr/diag/sysdiag (execute from root).

TROUBLESHOOTING:

Simple Debugging Options:

1) If you have a crash with a memory parity error, switch the CPU to DIAG mode. This will inhibit auto-reboot, so that it should then be possible to execute the debug routines (for 3/60s and 4/110s) that PSE have generated.

Known Bugs:

1) SUN doc set - Installation Notes for the Sun 4100 Board set, Rev A, 1988: page 56, Table C-1 - on a 20 MByte configuration, pins 3-4 should NOT be jumpered.

CONFIGURATION NOTES:
3/80 - low profile SIMMs work in all slots. Medium profile SIMMs work in banks 0-2, but are very tight in bank 3 in the backmost slots.
3/80 - 4MB SIMM compatiblity requires ECO #6238. PROM goes from 5251041-05 to -06

4/60, 4/65 - the first bank of SIMMs (bank 0) must be the near bank on the right hand side. After that it doesn't matter.

4/330 - Configuring the 4/330 can be relatively complex. First, SIMMs must be added 8 at a time, either on the CPU or extra memory board. On the extra memory board (which maxes out at 16 SIMMs), there is a jumper to select whether it is half or fully populated. You cannot mix SIMM sizes on a single board (either CPU or memory), athough the SIMM size on the CPU can be different from the memory board's SIMMs (there is a jumper select for 1 vs 4MB SIMMs).
4/330 - rev 3.0.2 and earlier: nominal 48MB max mem config. 4MB SIMMs work only on on the CPU card. They can be made to work on the first expansion memory module (they are too tall for the second board) by fully populating it and then booting via diag mode and using a dumb terminal to exit diagnostics before you get to the failing memory diagnostic.
4/330 - rev 3.0.3: 96MB max. Makes 4MB SIMMs work correctly on expansion cards. However the work-around listed above does not work.

386i/150 -- the memory card comes populated with 4 SIMMs. 4 more (Clearpoint) SIMMs can be added to this. There can be two memory cards total.

Silicon Graphics - Maximum amount of memory that can be installed is 32MB. This is a restriction of the EPROM. If you attempt to install more than 32MB you will get an exception error, zero memory and system will not boot. Silicon graphics has not qualified 4MB SIMMs and will not support them. But customers confirm 32MB of 4MB SIMMs have been known to work.

Other reports have indicated when installing 4MB SIMMs that only Toshiba DRAMS will be recognized by the system.

General Dynamics of Fort Worth Texas reported that they got a system operational with 48MB of memory installed. But could not mix 1MB and 4MB SIMMs together. They also reported at an earlier time that they had mixed SIMM sizes successfully using Toshiba DRAMS.

SUN 4/330, 370, 390 INSTALLATION

On the 4/3xx CPU board, there are 8 SIMM slots. These must be completely populated, with either 1MB or 4MB SIMMs (low/medium profile, and fairly thin). There is one jumper that must be set for 1MB or 4MB modules. It is a two post jumper with no jumper plugs installed for 1MB SIMMs, but the customer needs to install a jumper for 4MB modules. The jumper posts are located near one corner of the block of SIMM slots (the jumper positions are clearly silkscreened on the board).

SUN 4/330 Expansion card:

Additonal 4MB SIMMs can be installed on the optional adaptor board located in the first of two narrow '3u' slots (parallel to the 3 9u slots, and in line with the 2 6u slots). Each of these boards has 16 SIMM slots- 2 banks of 8 slots each. These boards have two jumpers that must be set .

a) 1MB vs 4MB SIMM jumper.
b) 1st bank vs 2nd bank jumper.

When installing memory on this board, keep in mind that you MAY NOT MIX SIMM TYPES ON ONE BOARD. The SIMMs are capacity determined by the jumper. If you are installing 4MB SIMMs, you must remove any 1MB SIMMs. They can probably be used elsewhere.

4MB INSTALLATIONS ON 4300 CPUs:

There are no problems with installing the 8 4MB SIMMs on the CPU board. However, we have identified 3 problems with installing SIMMs on the expansion board(s):

1- you cannot install medium profile 4MB SIMMs on the second 4/330 expansion card. Tolerances are simply too tight to allow them to fit (they fit fine on the first board). This problem is resolved with low profile SIMMs.

2- diagnostics fail when 4MB jumper is configured on the expansion card with PROM revs 3.0.1 and 3.0.2. See #3 for work around.

3- diagnostics also fail if there are only 8 4MB SIMMs on the expansion board. The expansion board must be fully populated (16 SIMMs). Once you have the expansion board fully populated with 4MB SIMMs, you must:

a) Set the CPU in diag mode.
b) attach a dumb terminal to port A.
c) boot the system
d) using the dumb terminal, exit the diagnostics (using the appropiate escape sequence) before the failing diagnostic starts.
e) re-enter the normal mode (switch back from diag mode) and the system should boot normally.

4/370, 4/390 Notes:

Installation of the SIMMs on the CPU are identical with the 4/330. However, the SIMM adaptor boards are different---a full 9u form factor. We believe there are 6 banks of 8 SIMMs each (48 slots total), and that there is a 1MB vs 4MB SIMM jumper (there could be more then one), as well as jumpers to select the number of populated banks. Extropolating from our experience with the 4/330, configuring the jumpers should be easy, and should be documented in the hardware installation/configuration manual that accompanies the system. Furthermore, we anticipate that the user will encounter the same similar problems as wit the 4/330, and that the same work around should apply.

4/330 Notes:

ROM version 3.0.2 only sees 48MB maximum.
Needs to upgrade ROM to version 3.0.3 to see 96MB maximum.

LOCATING DEFECTIVE MEMORY IN A SUN 3/60

DETERMINE WHETHER MEMORY IS AT FAULT

When a Sun 3/60 detects a serious system error, the resulting error condition will likely cause the system to exit UNIX. When this happens, one or more error codes will be displayed. Messages describing parity errors or memory errors indicate a high probability of a memory failure.

NOTE: depending on the nature of the error encountered, the error message may scroll off the screen and be lost. If the error condition can be reproduced, you can stop the scrolling by typing '<L1> A' to halt the processor. It may be necessary to repeat this until the scrolling stops.

DETERMINE WHICH PROCEDURE TO USE

There are different procedures for determining which SIMM is at fault, depending on which version of ROM is in the system. The ROM version is always printed during the power-up banner display. If the customer doesn't have the information, have him bring the system down (to the ">" console prompt) and enter:

```
> kb<CR>
```

This will redisplay the banner, including the ROM version.

DETERMINE WHICH BANK CONTAINS DEFECTIVE SIMM(S): ROM VERSION 1.5 AND EARLIER

In older systems (systems using ROM version 1.5 or earlier), you must have a value for the PME (page map entry) in order to determing the bad SIMM. This may be displayed directly, or, more likely, you will determine it using a virtual address (VADDR). NOTE: If the processor halts immediately after a failure (does not start to reboot), the MMU register contents will be unaltered and the virtual address which it reports can be used to generate a valid PME. If the system does not halt - if it starts to reboot - the MMU register contents may still be valid if you quickly halt the system (using '<L1> A').

If a value for the PME is not displayed, use the VADDR to generate it:

```
>p <vaddr><CR>
```

Example: "Vaddr=F012345E"

```
>p F012345E<CR>
```

This should yield:

```
>Page Map NNNNNNNN , [XX]: MZZZZNLL ?
```

The PME is the value represented by MZZZZNLL. This PME is valid if the most significant bit (MSB) is high - that is if the hexadecimal digit represented by 'M' is greater than 7 (between 8 and F, inclusive).

To determine the actual bad bank, take the digit represented by the 'N', divide it by 2, and discard any remainder. The value should lie between 0 and 5, inclusive.

DETERMINE WHICH BANK CONTAINS DEFECTIVE SIMM(S)
ROM VERSION 1.6 AND LATER

In later ROM versions, the physical address is used to determine the bank in which the failing SIMM is located. To determine the bank, ignore the 5 least significant digits of the physical address - the remaining 3 digits can be used to determine the bank in which the error occured.

PADDR	Bank	Where in memory
000xxxxx-003xxxxx	1	In first 4Mb
004xxxxx-007xxxxx	2	Between 4Mb and 8Mb
008xxxxx-00Bxxxxx	3	Between 8Mb and 12MB
00Cxxxxx-00Fxxxxx	4	Between 12Mb and 16Mb
010xxxxx-013xxxxx	5	Between 16Mb and 20Mb
014xxxxx-017xxxxx	6	Between 20Mb and 24Mb

DETERMINE WHICH SIMM IS DEFECTIVE

Use the value of the parity error register, DX, where X is a hex digit, to determine the location of a bad SIMM within a bank. Convert that hex value into its binary representation. The high bit(s) will point to the bad location(s) (the location is relative to the first SIMM in a bank).

X	Binary	SIMM Location
*	******	*************
1	xxx1	first
2	xx1x	second
4	x1xx	third
8	1xxx	last

EXAMPLES:
Example 1: ROM Version 1.6
When the error occured, the message displayed contained:

> Parity Error Register D4<intr, intena, check, err08>
> Physical Address = 00D13B2C

When we drop the 5 least significant digits of the physical address we are left with "00D". In the table we see that D corresponds to Bank 3 which is between 12Mb and 16Mb.

We now find the second digit of the parity error register (4) and convert it into its binary representation:

4 = 0100

which points to the third SIMM in the bank.
Conclusion: the third SIMM in the fourth bank (i.e. bank 3) is bad

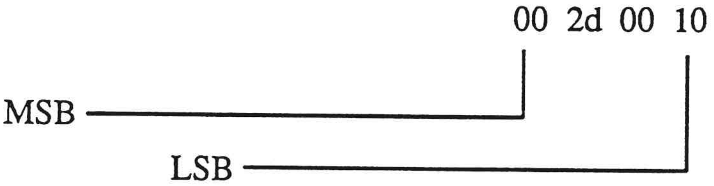
Example 2: ROM Version 1.5
"Parity Error Register
D8<INTR,INTENA,CHECK,ERR 24>"

The second digit of the value in the parity error register (8) indicates the location of the defective SIMM(s).
8 = 1000
which points to the last SIMM in a bank.

Example 3: ROM Version 1.5
You may also use an XOR of the contents of the parity error register:

"Parity Error Register
Xor = 002d0010"

002d0010 is a longword which comprises 4 bytes as follows:



Similar to the previous examples, the first byte corresponds to the last SIMM, and any non-zero value indicates a bad SIMM. Therefore, in this example SIMMs 3 and 1 are bad.

SUN 3/60 SIMM LAYOUT

BANK 5	SIMM 4	UNIT 23	SLOT 24	MSB
	SIMM 3	UNIT 22	SLOT 23	
	SIMM 2	UNIT 21	SLOT 22	
	SIMM 1	UNIT 20	SLOT 21	LSB
BANK 4	SIMM 4	UNIT 19	SLOT 20	MSB
	SIMM 3	UNIT 18	SLOT 19	
	SIMM 2	UNIT 17	SLOT 18	
	SIMM 1	UNIT 16	SLOT 17	LSB
BANK 3	SIMM 4	UNIT 15	SLOT 16	MSB
	SIMM 3	UNIT 14	SLOT 15	
	SIMM 2	UNIT 13	SLOT 14	
	SIMM 1	UNIT 12	SLOT 13	LSB
BANK 2	SIMM 4	UNIT 11	SLOT 12	MSB
	SIMM 3	UNIT 10	SLOT 11	
	SIMM 2	UNIT 9	SLOT 10	
	SIMM 1	UNIT 8	SLOT 9	LSB
BANK 1	SIMM 4	UNIT 3	SLOT 4	MSB
	SIMM 3	UNIT 6	SLOT 7	
	SIMM 2	UNIT 5	SLOT 6	
	SIMM 1	UNIT 4	SLOT 5	LSB
BANK 0	SIMM 4	UNIT 7	SLOT 8	MSB
	SIMM 3	UNIT 2	SLOT 3	
	SIMM 2	UNIT 1	SLOT 2	
	SIMM 1	UNIT 0	SLOT 1	LSB

LOCATING DEFECTIVE MEMORY IN A 4/110

DETERMINE WHETHER THE MEMORY IS AT FAULT

When a serious system error occurs, the system will likely exit UNIX. When this happens, one or more error codes will likely be displayed. Messages describing parity errors indicate a high probability of memory failure.

NOTE: depending on the error, the error message may scroll off the screen and be lost. If the error condition can be reproduced, you can type '<L1>a' to halt the processor. It may be necessary to repeat this until the scrolling stops.

Once you have determined that memory is at fault, you may be able to determine which SIMM is causing the error by interpreting the error message further.

DETERMINE WHICH BANK CONTAINS DEFECTIVE SIMM(S)

Find the virtual address (VADDR) of the failing SIMM and use it to determine the relevant portion of the physical address as follows. At the monitor prompt, type:

```
p <VADDR>
```

which will return an eight digit hexadecimal value - for example FFFF1FF2. Unless yours is a 20 MB system, take the last digit (2, in the example above). Discard the most significant bit (if the number is greater than 7, subtract 8 from it). Finally, take the complement of the bits (take this value and subtract it from 8) to get the number of the bank of the bad SIMM.

EXAMPLE: 2 =>0010 take binary equivalent
=>010 discard MSB
=>101 take complement
=> 5 decimal equivalent

If yours is a 20 MB system, the procedure is similar, albeit somewhat more complicated. First, identify the fifth (1 in the example above) and the last digits (again, 2). Take the last bit of the fifth digit (if the number is even, it is 0, and if it is odd, it is 1). Take this value and shift it left 2 places (multiply it by 4). Take the last two bits of the last digit (if it is greater that 7, subtract 8 and if the remander is greater than 3, subract 4). Add these two values together (it should yield a number that is less than 8) and subtract it from 8 to get the number of the bad bank.

EXAMPLE: 1 =>0001 binary equivalent 2 =>0010 bin equiv
=>1 take LSB =>10 disc bits
=>100 shift left twice
=>110 add values
=>001 take complement
=> 1 decimal equivalent

DETERMINE WHICH SIMM IS DEFECTIVE

To ascertain which SIMM within a bank is defective you must either find the Xored byte displayed by diagnostics (identifying which byte is bad) or use the virtual address to identify the bad byte.

If you must use the VADDR, take the last 2 bits (take the last digit and if it is greater than 7, subtract 8. If the remainder is greater that three, subtract 4). From the examples above the VADDR is FFFF1FF2, and so:

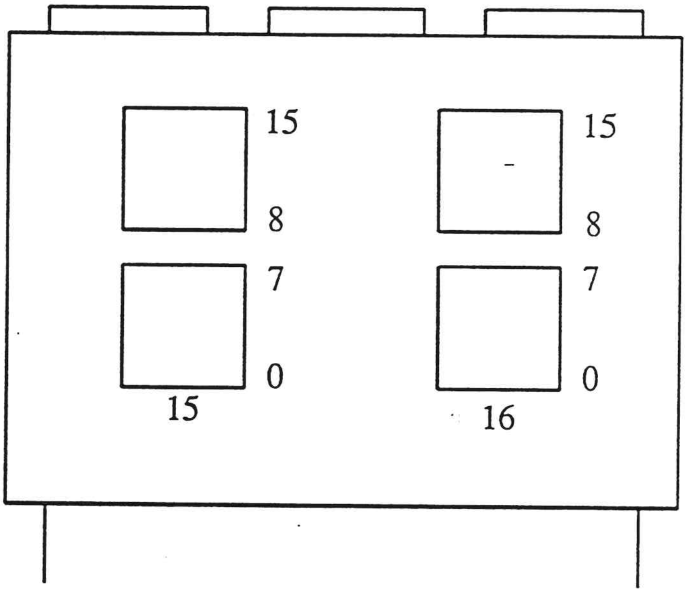
EXAMPLE: 2 =>0010 binary equivalent
=>10 discard high bits
=> 2 decimal equivalent
so the failing byte is 2.

To determine the failing SIMM, use the following formula:
(failing bank * 4) +failing byte => U number

Then take this U number and go to the chart below (next page).

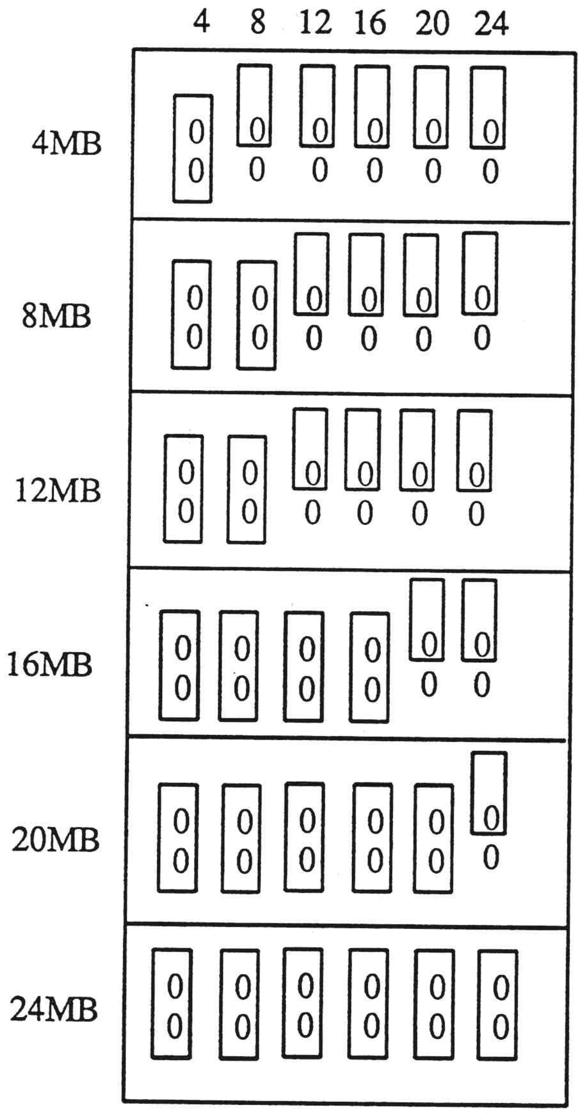
U#	SIMM	BANK#
left side(U15xx)		
0	3	0
1	2	0
2	1	0
3	0	0
4	7	1
5	6	1
6	5	1
7	4	1
8	11	2
9	10	2
10	09	2
11	08	2
12	15	3
13	14	3
14	13	3
15	12	3
right side(U16xx)		
16	3	4
17	2	4
18	1	4
19	0	4
20	7	5
21	6	5
22	5	5
23	4	5
24	11	6
25	10	6
26	9	6
27	8	6
28	15	7
29	14	7
30	13	7
31	12	7

NOTE: With the board extractor handles toward you, U15xx SIMMS are to your left and the U16xx SIMMS are to your right. Within each of these sets, SIMMS are numbered from 0 through 15 starting at the bottom (toward you).



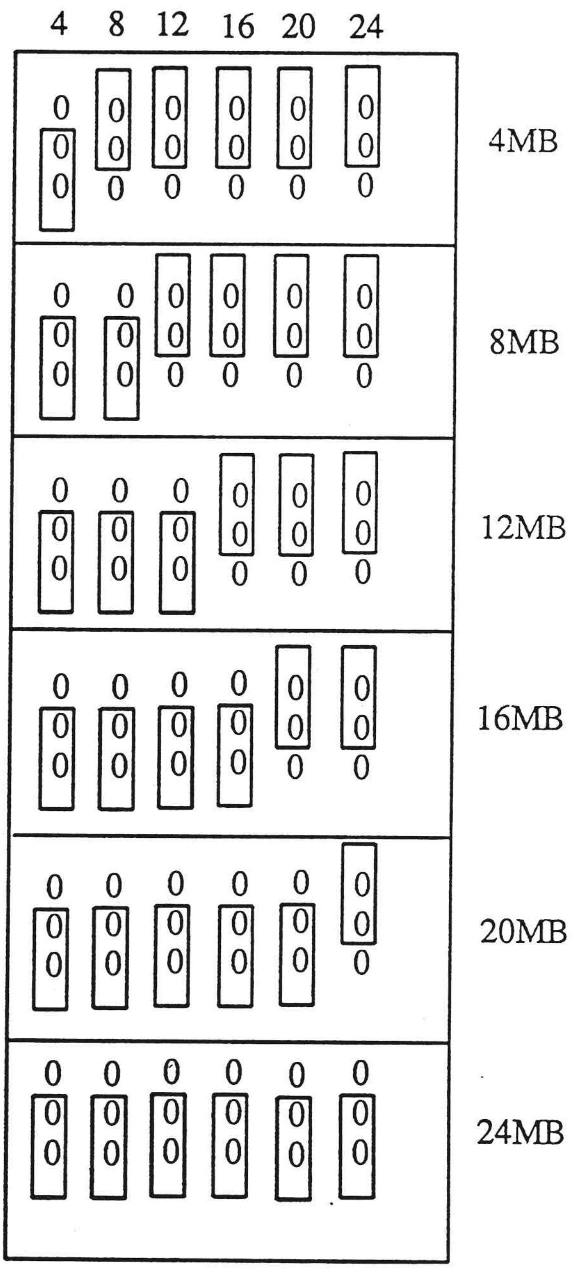
For further information on isolating 4/110 memory problems, check with SUN Microsystems for information from their Education Service's hardware maintenance courses, or with their hardware customer support group.

The Sun 3/60 jumpers are located in the left rear corner of the board. The jumpers may be either two or three post jumpers.



Two Post Configuration

Note: The two jumpers on the far right (EXTUR and HIGHRES) are not memory jumpers. DO NOT CHANGE THEM



Three Post Configuration

Jumper
J100

8MB	16MB	20MB	32MB	
$\boxed{0\ 0}$	0 0	$\boxed{0\ 0}$	0 0	Pin 1-2
0 0	$\boxed{0\ 0}$	0 0	$\boxed{0\ 0}$	Pin 3-4

Jumper
J400

8MB	16MB	20MB	32MB	
0 0	$\boxed{0\ 0}$	0 0	$\boxed{0\ 0}$	Pin 1-2
$\boxed{0\ 0}$	0 0	0 0	$\boxed{0\ 0}$	Pin 3-4
$\boxed{0\ 0}$	$\boxed{0\ 0}$	$\boxed{0\ 0}$	0 0	Pin 5-6

Jumper
1400

8MB	16MB	20MB	32MB	
$\boxed{0\ 0}$	0 0	0 0	$\boxed{0\ 0}$	SAME
0 0	$\boxed{0\ 0}$	$\boxed{0\ 0}$	0 0	DIFF
$\boxed{0\ 0}$	0 0	0 0	0 0	256K
0 0	$\boxed{0\ 0}$	$\boxed{0\ 0}$	$\boxed{0\ 0}$	1M
0 0	0 0	0 0	0 0	2PM*
$\boxed{0\ 0}$	$\boxed{0\ 0}$	$\boxed{0\ 0}$	0 0	<32M
0 0	0 0	0 0	$\boxed{0\ 0}$	32M**

Jumper
J1300

8MB	16MB	20MB	32MB	
$\boxed{0\ 0}$	0 0	0 0	$\boxed{0\ 0}$	SAME
0 0	$\boxed{0\ 0}$	$\boxed{0\ 0}$	0 0	DIFF
$\boxed{0\ 0}$	0 0	$\boxed{0\ 0}$	0 0	256K
0 0	$\boxed{0\ 0}$	0 0	$\boxed{0\ 0}$	1M
0 0	0 0	0 0	0 0	2PM*
$\boxed{0\ 0}$	$\boxed{0\ 0}$	$\boxed{0\ 0}$	0 0	<32M
0 0	0 0	0 0	$\boxed{0\ 0}$	32M**

JUMPERS:
E01-E16 Starting address- E16 low order, 64KB multiples(down=0)
E17 Supervisor mode only - down enables both modes
E18 24 vs 32 bit addressing - up is 24 bit
E19 CSR addressing mode - down for 16 bit (short I/O) addressing
E20-E23 CSR address - unique for board
E24-E26 Factory pre-set
E28(8/16MB only) memory size select - up for 16MB
E29(8/16MB only) Low power refresh

DIAGNOSTICS: system dependent
LED indicators: red - double bit error
yellow - single bit error
green - no error since last reset

TROUBLESHOOTING: system dependent
Verify that the board does not contain a mixture of old and new address and data chips (new - 5133A: address, 5134A: data; old - 5133: address, 5134: data).

Known Bugs:
Don't advertise to customer: battery backup option does not work.

CONFIGURATION NOTES:
Some Motorola systems do not require the VMERAM-M

VMERAM-M requires the slow address and data chip; Motorola did not approve of the fast, new address and data chips.

Motorola CPU 147SA-1 has 8MB of resident memory
When user installs 16mb vme board for a total of 24 mb of memory, in 24 bit mode the system sees only the first 8mb of memory. In 32 bit mode the system sees only the upper 8mb of memory.
Send pal JPL-001-0050W. Have the user replace the pal in location Z (last row) 5th chip from the right with this new pal. This will allow both 24 and 32 bit addressing. The jumper setting doesn't matter for addressing 24/32 bit since this pal disables the selection and allows both 32 and 24 bit addressing.

VMERAM-FP1: July 24, 1990
Jim Stiles(PSE), Leo Cerpial(Design), Paul Lola(Tech)

BOARD DESC: VME 6U, 4HP

VERSION:	TECHNOLOGY:	
/4MB	70ns 1MB ZIPs, 1/4 pop	
/8MB	70ns 1MB ZIPs, 1/2 pop	
/12MB	70ns 1MB ZIPs, 3/4 pop	
/16MB	70ns 1MB ZIPs	
/32MB	80ns 4MB ZIPs, 1/2 pop	
/48MB	80ns 4MB ZIPs, 3/4 pop	
/64MB	80ns 4MB ZIPs	

MAX MEM CAP:, SLOT DEPENDENCY: system dependent

ERROR CHECKING: parity

TERMINATOR: none

JUMPERS:
W1, W2 - UPS, battery backup (remove jumpers to enable UPS)
W4 - A32 (down = enabled)
W6 - A24 (down = enabled)

SWITCHES:
UF3, UF4 - starting base address
UF4.6 => 1MB increment....UF3.1 => 2GB increment (up=on)
UF1, UF2 - ending base address (last 1MB mapped to this board)
UF2.6 => 1MB increment....UF1.1 => 2GB increment (up=on)
UF7, UF8 - CSR address
Rev C and later
UF7.1 - .4; values 0 - F (off = 1)
UF8.1; on=B, off=F
UF8.2; on=E, off=F
UF8.3-4; on,on=1, on,off=5, off,on=9, off,off=D

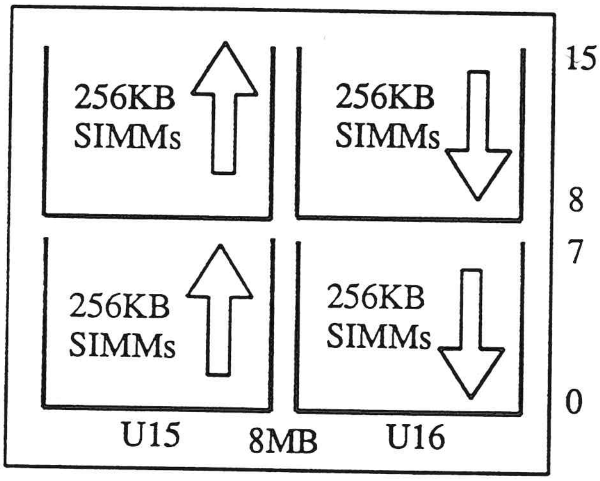
DIAGNOSTICS: system dependent
LEDs: red - parity error
green - activity, memory being accessed

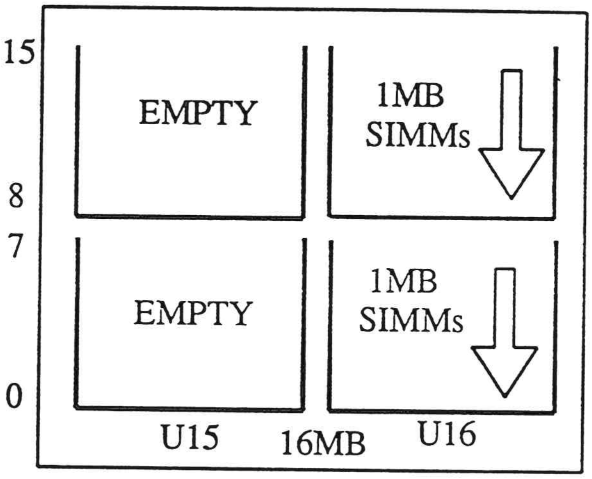
CSR bits:
D0: EPER (when=0, disables BERR on parity error)
1: WWP (when=1, sets parity bit incorrectly)
2: B0PED (when=1, parity error on byte 0)
3: B1PED (when=1, parity error on byte 1)
4: B2PED (when=1, parity error on byte 2)
5: B3PED (when=1, parity error on byte 3)
6: not used (=1)
7: PED (when=1, parity error has occurred)

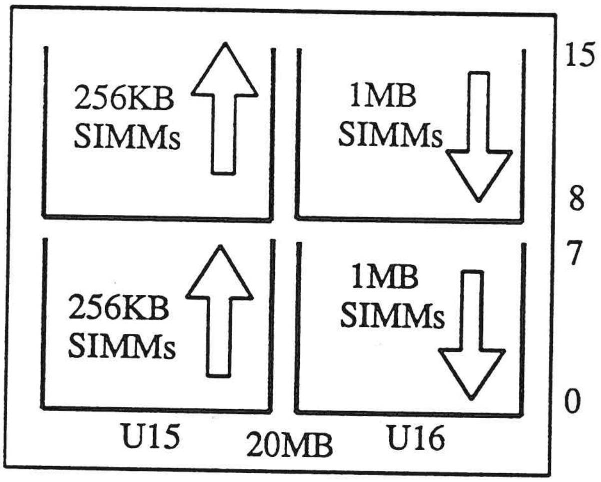
TROUBLESHOOTING: system dependent
Common Failures:
the various switches have relatively high failure rate.

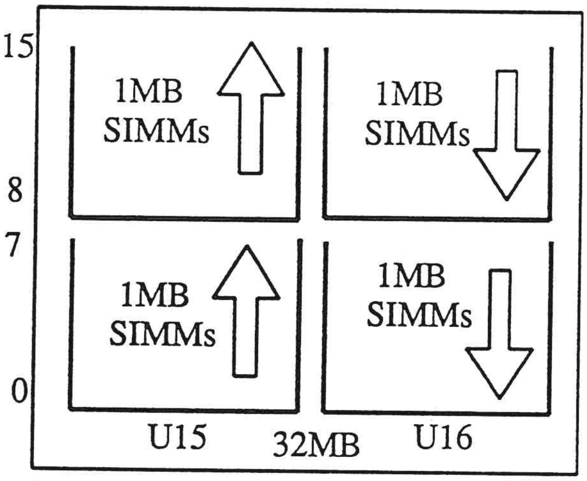
Known Bugs:
Suffers from the A24/A32 bug, the same way the VMERAM does.

4/110 Memory Configurations:









VERSARAM: July 9, 1990
Jim Stiles(PSE), Isabel Sigman(Design), Mike Fahey(Tech)

BOARD DESC: 9.25"x14.5"

VERSION:	TECHNOLOGY:
V-RAM 68/256	64Kb DRAMs, 1/4 pop
V-RAM 68/512	64Kb DRAMs, 1/2 pop
V-RAM 68/1	64Kb DRAMs, full pop
V-RAM 68/1A	256Kb DRAMs, 1/4 pop
V-RAM 68/2A	256Kb DRAMs, 1/2 pop
V68/4MB	256Kb DRAMs, full pop
/2MB	256Kb 150ns DIPs, half pop
/4MB	256Kb 150ns DIPs
/8MB	1Mb 150ns DIPs, half pop
/8MB-C	unsocketed DRAMs, socketed PALs, for CCI
/16MB	1Mb 150ns DIPs

MAX MEM CAP:, SLOT DEPENDENCY: system dependent

ERROR CHECKING: EDC

TERMINATOR: none

JUMPERS:

V-RAM 68:

DRAM Size: SW11, 12
Memory Size: J1-J8
Starting Address: SW05-10
CSR Address: SW01(high order)-04

VERSARAM:

E1-16 - Starting Address: 64K boundaries, E1 is low order bit
E18 - Addressing Mode: A24, up; A32, down
E19 - CSR Addressing Mode: Absolute, up; Short, down
E20-23 - CSR address: unique for each memory device
E24-25 -
E26 -
E27-29 - memory sizing
E30 -

DIAGNOSTICS: system dependent

TROUBLESHOOTING: system dependent

NOTE: there is a document that describes how to generate and clear single and double bit errors.

VMERAM: April 23, 1990
Jim Stiles(PSE), Isabel Sigman(Design), Paul Lola(Tech)

BOARD DESC: VME 6U, 4HP. 64 bit cache

VERSION:	TECHNOLOGY:	MFG'R EQUIV:
/1MB	64Kb 150ns ZIPs (no longer available)	
/2MB	256Kb 150ns ZIPs, half pop	
/4MB	256Kb 150ns ZIPs	MVME 230-1
/8MB	1Mb 150ns ZIPs, half pop	MVME 230-2
/16MB	1Mb 150ns ZIPs	MVME 230-3
-M	Motorola: PAL Z5 to 001-0050Y (E18 redefined to answer to both 24 and 32 bit addressing)	
-F	order regular version	
-X	Charles River Data: PAL Z5 to 001-0050W (E17 and E18 redefined)	
-C	Obsolete	

VERSIONS: -M, -F, -X, -C Available in standard sizes: 2, 4, 8, and 16MB
also: VMERAM/512KB

MAX MEM CAP:, SLOT DEPENDENCY: system dependent

ERROR CHECKING: VMERAM - EDC

VSBRAM: August 16, 1989
Jim Stiles(PSE), Isabel Sigman(Design), (Tech)

BOARD DESC: dual ported double height VME card w/ dual 64 bit cache
NOTE: Rev A boards are different from Rev B boards. See configuration notes below.

VERSION:	TECHNOLOGY:
EC1/2MB	256Kb ZIPs
EC1/4MB	additional 256Kb DIPs on daughter
EC1/8MB	1MB ZIPs
EC1/16MB	additional 1MB SOJs on daughter

PROCESSOR:, SLOTS: (MEMORY:, OTHER:), MAX MEM CAP:, CPU ON-BOARD MEM:, SLOT DEPENDENCY:, SYS REQUIREMENTS:, DIAGNOSTICS: (Memory Verification:) - all system dependent

TERMINATOR: none

JUMPERS:
VME starting address (switches)
VSB starting address (switches)
CSR address (switches)
Board Size (switches)
W1,2 - VME space address
W3 - S/U mode
W4 - CSR address mode
W5,6 - VSB space bits
W7,8 - battery back up (separate jumper block)
ERROR CHECKING: 64 bit EDC, with cache

Starting Addresses (both VME and VSB). NOTE: All switches in the 'up' position indicates a starting address of zero.

BACKPLANES: for VSB, backplanes must:
a) be wired (wire wrapped), or
b) have appropriate cable, or
c) be special backplane with P2 bussed

TROUBLESHOOTING:
Common Failures:

Simple Debugging Options:

Known Bugs:

CONFIGURATION NOTES: System must adhere to VSBSPEC Rev C (IEEE 821 subsystem bus spec). This includes:
- maximum of 6 slots for each VSB section
- no other non-VSB device in VSB backplane is using rows A and C of the P2 connector

The first eight VSBRAM boards sold to customers use Rev A artwork. The jumper switches are different on Rev B boards. The differences are as follows:

REV A VSBRAM:

DW4
1 |-
2 | CSR
3 | address
4 |-
5 N/A
6 N/A
7 |-
8 | VME starting address
9 | (high order bits)
10 |-

DW5
1 |-
2 |
3 |
4 |
5 | VME starting address
6 | (low order bits)
7 |
8 |
9 |
10 |-

REV B VSBRAM:

DW4 1 |-
2 | CSR
3 | address
4 |-

DW5 1 |-
2 | VME starting address
3 | (high order bits)
4 |-

DW6 1 |-
2 |
3 |
4 |
5 | VME starting address
6 | (low order bits)
7 |
8 |
9 |
10 |-

VSBRAM-EC1 Jumper Configuration

VME ADDR SPACE	W1	W2
A24	UP	DN
A32	DN	UP
A24 & A32	UP	UP

MODE	W3
SU	UP
USER	DN

CSR ADDR MODE	W4
CSR A16 MODE	UP
BOARD DEFAULT	DN

VSB SPACE BIT	W5	W6
ILLEGAL	DN	DN
I/O ADD SPACE	DN	UP
ALT ADD SPACE	UP	DN
SYS ADD SPACE	UP	UP

BATTERY BACKUP	W7	W8
ENABLE	OUT	OUT
DISABLE	IN	IN

256 KB low order address switch
512 KB
1 MB
2 MB
4 MB
8 MB
16 MB
32 MB
64 MB
128 MB
256 MB
512 MB
1 GB
2 GB high order address switch